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CQ

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JULY
1957
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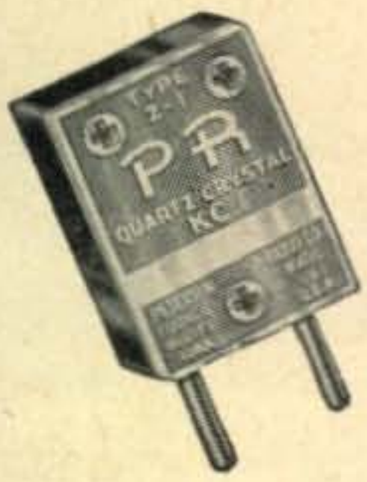

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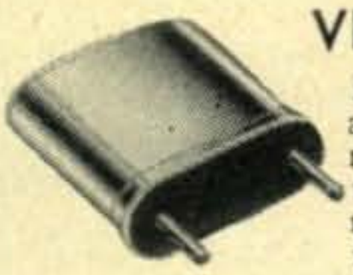

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For further information, check number 4 on page 126.

Designed for

Application

90711

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Variable Frequency Oscillator

The No. 90711 is a complete transmitter control unit with 6SK7 temperature-compensated, electron coupled oscillator of exceptional stability and low drift, a 6SK7 broad-band buffer or frequency doubler, a 6A67 tuned amplifier which tracks with the oscillator tuning, and a regulated power supply. Output sufficient to drive an 807 is available on 160, 80 and 40 meters and reduced output is available on 20 meters. Close frequency setting is obtained by means of the vernier control arm at the right of the dial. Since the output is isolated from the oscillator by two stages, zero frequency shift occurs when the output load is varied from open circuit to short circuit. The entire unit is unusually solidly built so that no frequency shift occurs due to vibration. The keying is clean and free from all annoying chirp, quick drift, jump, and similar difficulties often encountered in keying variable frequency oscillators.

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Authors would do well to send for the CQ Style sheet which will explain our confused system of abbreviations and symbols. The article "Author Author" (October 1952 CQ) tells all about how to write articles for CQ, how much we pay, etc. Reprints of this article are available from CQ if you have been improvident in keeping up your radio library.

CQ Certificates:

The WPX Award is granted for two-way contact with certain number of amateurs in different prefixes of the world. Full details are contained in the WPX Record Book which is available for 15c from CQ. Application forms are free.

The WAZ Award is granted for contacting all of the amateur zones of the world. Current standings of amateurs working for this award will be found in the DX column. A DX Zone map of the world is available free from CQ. Send stamped envelope.

Technical Information:

CQ has no one available to answer technical questions. Please check the 11-year cumulative index which was published in the January 1956 CQ for information about articles in past issues of CQ. The December 1956 CQ yearly index will bring you up to 1957. Most back issues are available at 50c each from us, check our "Back Issue" ad for details on those not available. Reprints of the Cumulative Index are available free.

Raymond Yard, W2DKF

It is with deep regret that CQ reports the passing of our faithful co-worker on the DX Contest Committee. Ray died on May 11th after a lingering illness. He will be sorely missed not only by the Contest Committee but also by the DX Fraternity.

← **For further information, check number 5 on page 126.**

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- *Phone or CW—160 through 10 meters.*
- *100 watts RF on phone—120 watts CW —parallel 6146 final.*
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- *Easy to build—TVI suppressed*

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Shpg. Wt. 107 Lbs.

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The Heathkit DX-100 phone-CW transmitter offers features far beyond those normally received at this price level. It has a built-in VFO, built-in modulator, and built-in power supplies. It is TVI suppressed, and uses pi network interstage coupling and output coupling. Matches antenna impedances from approximately 50 to 600 ohms. Provides a clean strong signal on either phone or CW, with RF output in excess of 100 watts on phone, and 120 watts on CW. Completely bandswitching from 160 through 10 meters. A pair of 1625 tubes are used in push-pull for the modulator, and the final consists of a pair of 6146 tubes in parallel. VFO dial and meter face are illuminated. High-quality components throughout! The DX-100 is very easy to build, even for a beginner, and is a proven, trouble-free rig that will insure many hours of enjoyment in your ham shack.

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For further information, check number 6 on page 126.

HEATHKIT DX-35
TRANSMITTER KIT

PHONE AND CW

MODEL DX-35

$56.95

Shpg. Wt. 24 Lbs.

$5.70 dwn., $4.78 mo.

This transmitter features a 6146 final amplifier to provide 65 watt plate power input on CW, with controlled-carrier modulation peaks up to 50 watts on phone. Modulater and power supplies are built in, and the rig covers 80, 40, 20, 15, 11 and 10 meters with a single band-change switch. Pi network output coupling provides for matching various antenna impedances. Employs 12BY7 oscillator, 12BY7 buffer and 6146 final. Speech amplifier is a 12AX7, and a 12AU7 is employed as modulater. Panel control provides switch selection of three different crystals, reached through access door at rear. Panel meter indicates final grid current or final plate current. A perfect low-power transmitter both for the novice or the more experienced amateur. A remarkable power package for the price. The price includes tubes, and all other parts necessary for construction. Comprehensive instruction manual insures successful assembly.

- *Phone or CW—80 through 10 meters.*
- *65 watts CW—50 watts peak on phone—6146 final amplifier.*
- *Pi network output to match various antenna impedances.*
- *Tremendous dollar value—easy to build.*

BRAND NEW

HEATHKIT DX-20
CW TRANSMITTER KIT

MODEL DX-20

$35.95

$3.60 dwn., $3.02 mo.

Shpg. Wt. 18 Lbs.

- *Designed exclusively for CW work.*
- *50 watts plate power input—80 through 10 meters.*
- *Pi network output circuit to match various antenna impedances.*
- *Attractive and functional styling—easy to build.*

Here is a straight-CW transmitter that is one of the most efficient rigs available today. It is ideal for the novice, and even for the advanced-class CW operator. This 50 watt transmitter employs a 6DQ6A final amplifier, a 6CL6 oscillator, a 5U4GB rectifier and features one-knob bandswitching to cover 80, 40, 20, 15, 11 and 10 meters. It is designed for crystal excitation, but may be excited by an external VFO. A pi network output circuit is employed to match antenna impedances between 50 and 1000 ohms. Employs top-quality parts throughout, including "potted" transformers, etc. If you appreciate a good signal on the CW bands, this is the transmitter for you!

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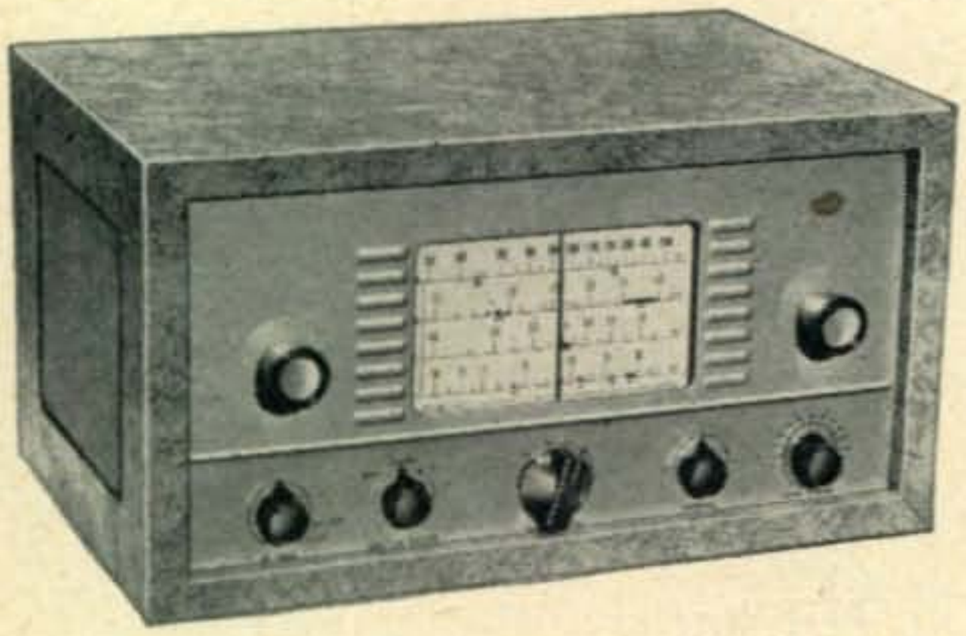
HEATHKIT

COMMUNICATIONS-TYPE, ALL BAND

RECEIVER KIT



This receiver covers 550 kc to 30 mc in four bands, and is ideal for the short wave listener or beginning amateur. It provides good sensitivity and selectivity, combined with fine image rejection. Amateur bands are clearly marked on the illuminated dial scale. Features transformer-type power supply—electrical band spread—antenna trimmer—separate RF and AF gain controls—noise limiter—headphone jack—and AGC. Has built-in BFO for CW reception. Shpg. Wt. 12 Lbs.

MODEL AR-3

$29.95

incl. excise tax (less cabinet)

$3.00 dwn., $2.52 mo.

CABINET: Fabric covered cabinet with aluminum panel as shown. Part 91-15A. Shipping Wt. 5 Lbs. $.50 dwn., $.42 mo. **$4.95**

Ⓐ HEATHKIT VFO KIT MODEL VF-1

Covers 160, 80, 40, 20, 15, 11 and 10 meters with three basic oscillator frequencies. Better than 10 volt average RF output on fundamentals. Requires 250 VDC at 15 to 20 ma, and 6.3 VAC at 0.45A. Incorporates regulator tube for stability and illuminated frequency dial. Shpg. wt. 7 lbs. $1.95 dwn., $1.64 mo. **$19.50**

Ⓑ HEATHKIT GRID DIP METER KIT MODEL GD-1B

Continuous coverage from 2 mc to 250 mc with prewound coils. 500 ua panel meter for indication. Use to locate parasitics, for neutralizing, determining resonant frequencies, etc. Will double as absorption-type wavemeter. Shpg. wt. 4 lbs. $2.00 dwn., $1.68 mo. **$19.95**

Ⓒ HEATHKIT ANTENNA IMPEDANCE METER KIT MODEL AM-1

The AM-1 covers 0 to 600 ohms for RF tests. Functions up to 150 mc. Used in conjunction with a signal source, will determine antenna resistance and resonance, match transmission lines for minimum SWR, determine input impedance, etc. Shpg. wt. 2 lbs. $1.45 dwn., $1.22 mo. **$14.50**

Ⓓ HEATHKIT "Q" MULTIPLIER KIT MODEL QF-1

Functions with any receiver having IF frequency between 450 and 460 kc that is not AC DC type. Operates from receiver power supply, requiring only 6.3 volts AC at 300 ma (or 12.6 vac at 150 ma), and 150 to 250 vdc at 2 ma. Simple to connect with cable and plugs supplied. Provides extra selectivity for separating signals, or will reject one signal to eliminate heterodyne. Effective Q of approximately 4000. Shpg. wt. 3 lbs. $1.00 dwn., $.84 mo. **$9.95**

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For further information, check number 8 on page 126.

Feenix, Ariz.

Deer Hon. Ed:

Scratchi are in the Hon. Hosspital, and I, Lil O. Watanabe, who maybe you remembering from previous letters I writing you, am trying hard not to be put in jalehouse. Yes indeedy, Scratchi are in bed of pane and in no shapely to writing you letter this month. Seeing as how I, his girl frend (or wunce was) am the one who putting him in Hon. Hosspital, it only seeming fare that I writing and giving all grewsome detales.

As you knowing, all these yeers Scratchi are leeding me on. He always saying I only girl in world for him, that he loving me deerly, and that some day he changing me from his fayvrit YL to his XYL.

Now, Hon. Ed., you knowing that Scratchi are a no good bum, and that he not meening all those things. Over and over he giving me engagement ring, then he picking fite so I getting mad and giving him ring back.

Each time he pawning ring and buying more amchoor radio stuff. I trying all ways and all things to getting him to the alter, but he slippery eel, that boy. Leap yeer, I saying to myself I can catching him, but what he doing? He leeping wrong way.

Now my Hon. Grandma, nice little old lady known by everybuddy as Nagasaki Nanny, are being famous for knowing all abouts marryage—after all, she marrying and burying six fine Hon. Gentlefellows. She telling me I having wrong approach, that only way to man's hart are thru stomack. I not having been trying that, on acct. I thinking that just because I young and pretty that are enough.

But, desiding to trying anything, so convincing Scratchi and his Hon. Brother Itchi that I should coming to there ranch for weekend and taking care of house and fixing up some 1/c meels for them. Even blowing hole weeks salary on new hairdo and new cupple little house-dresses.

Showing up britely and erly Sattidy morning after brekfast. Finding kitchen are not fit place for pigs, letting along peeples, so spending morning cleening like mad. Managing to serving reel 1/c lunch to Itchi and Scratchi, and are hardly getting thank you, unless you

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can counting cupple little noyses they making as leeving the table.

Working like foorys all afternoon cleening up rest of house and washing clothes, then for dinner are fixing good old sukiyaki that are long-time ressipea in family. Scratchi are evidently liking it as he eating dinner like pig, as youshewal. He not saying he liking it, but this no surprise, as he hardly saying to words to me all day anyhows. At leest Brother Itchi giving me big compliments on dinner.

This are reel nice, of coursely, but it are not Brother Itchi I loving. Sometimes I thinking I need Hon. Hed Eggsaminayshun, on acct. Brother Itchi are much better mans to marrying. But, as old Japanese eggspreshun going, that are the way the mop flops.

Second day, Sunday, again showing up nice and erly. Are wareing most fetching housefrock. Getting rite to work, doing little things like dusting, alltimes singing poplar love songs. Not seeing Scratchi, doing little snooping, and finding he are in Ham Shack with door closed.

Also noting that if going in room next to Shack are able to heering what going on in Ham Shack. So, putting up ironing bord in next room and starting to ironing yesstidays washing. First thing I knowing are heering Scratchi in reel eggsited voice calling another amchoor.

Thinking he might be getting rare dee-x, listening even more closely. Hon. Ed., you woodn't buleeving it!! Who are he calling but this gal amchoor. I heering her coming back to Scratchi with voyce like Marrylin Monrow. Honest to Petely, her voyce so much like cat purring you could heering the lowdspeeker rumbling.

Not only that, she asking Scratchi howcomes she not talking to him lately, where he been keeping himself, and when are he coming to visit her likesame he been promising to doing.

Up to this point maybe I can keeping my hed, but what you thinking that no-goods boy frend of mine doing next? He going back to her and saying he surely are lonesome, and he reely longing to going riding with her under romantic Arizona moon.

Before I knowing what I doing, I are rushing into Shack, grabbing Hon. Chair, and busting it over Scratchi's silly hed. That ending that QSO, you can betting. And, Scratchi are reely out cold. Colder than he ever before being after I busting him one over the hed.

So, I yelling for Itchi, and we piling poor old Scratchi iinto car and taking to hosspital like sixties. And, that are where he are and where I still am.

Right now I sitting in visitors room writing you, and big poleeceman are watching me. Itchi are telling cop it are all an accident, but cop saying he wateing around so he can talking to Scratchi when he coming to.

Hon. Ed., I are in horribul mess. I truly

[*Continued on page 116*]

Incomparable Value!

Model SX-100
Amateur Net $295.00

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How have we measured this approval? *First*, by the letters we receive—more favorable comment than ever before. *Second*, by the conversation we hear on the air from owners and observers alike. *Third*, by sales—the SX-100 is one of the *fastest selling communications receivers we've ever designed.*

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3. Notch depth control for maximum null adjustment.

4. Antenna trimmer.

5. Plug in laboratory type evacuated 100 KC Quartz crystal calibrator—included in price.

6. Logging dials for both tuning controls.

7. Full precision gear drive dial system.

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For further information, check number 11 on page 126.

EDITORIAL . . .
WAYNE GREEN

. . . de W2NSD

NEVER SAY DIE

Old Shep

K2ORS's article on "perspective" (May CQ) brought many letters of agreement and congratulation. Those of you in the eastern U.S. may have taken out a few moments to tune in on ol' Shep on Sunday nights (9 to 1) on WOR (710) and listen to his quite unusual weekly four hour monologue. He has gotten so popular in the area that I find that merely knowing him makes me in demand. Jean Shepherd clubs are forming all over the place.

On recent visits to Northern Jersey (W2BBK), Scarsdale, and the remoter corners of Brooklyn I found that Shep was all the rage. High school boys are measured by their ability to imitate him. The girls listen minutely to his broadcasts so they can avoid "creaping meatballism".

I just thought you'd like to keep up to date.

New Distribution System

Letters come in pretty steadily complaining about not being able to find CQ on the newsstands any more. We cut down on our newsstand circulation quite some time ago and have been doing all we could to get the idea across that we really prefer to have you aboard as a subscriber. This is not only safer, but a heck of a lot cheaper too. And besides, the advertisers like it better.

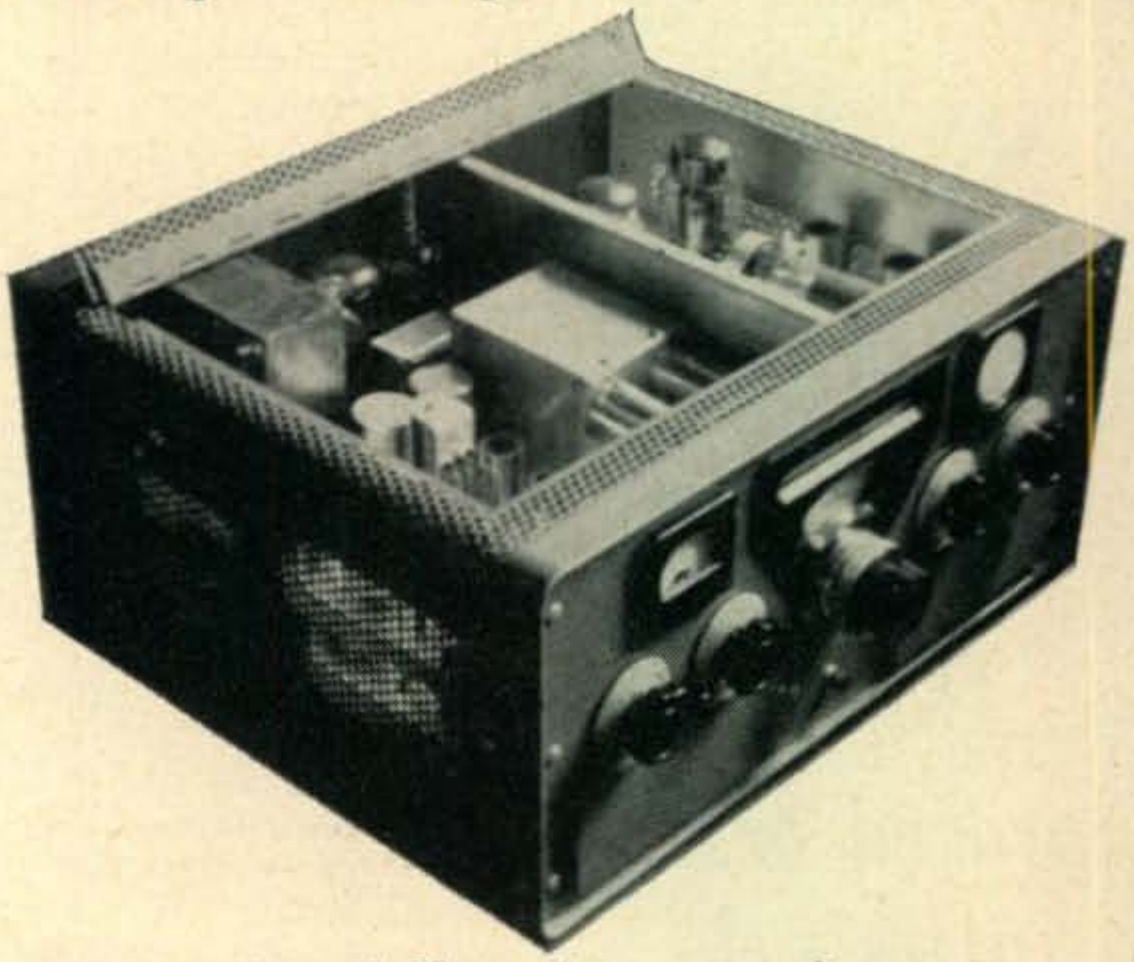
If you are still supporting your newsdealer you may run into even more difficulty than usual for we are changing to a new magazine distributor. It is a good outfit, but I shudder to think how long it will take them to find out how many issues to send to what places. Things will probably be in a turmoil for months. Keep holding out on that subscription if you want, but get set for some real magazine hunting for the next couple months. And remember, subscribers get first crack at the classified section.

Docket 11994

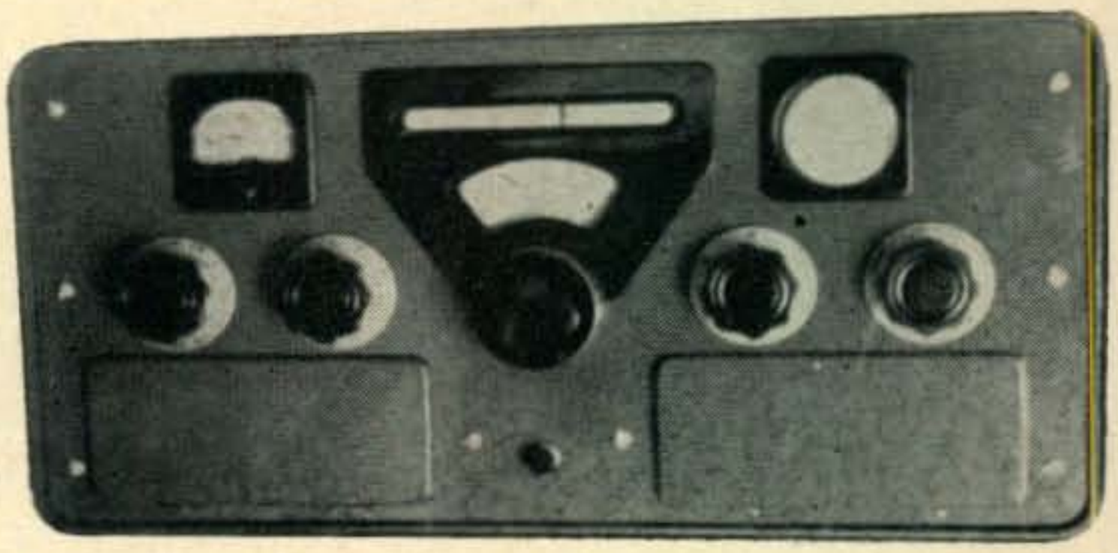
Only the first flash reactions to my editorial in the June CQ have come in so far. All of them are indicative of action, so maybe we will be able to hold on to eleven meters. Along this line I have been trying to find someone down in Washington who could keep us all informed on just what was up in a regular column. No takers. We have almost as much secrecy ham radio-wise in Washington as do the nuclear crowd. Nuts.

New SSB Exciter

Central Electronics unveiled their new Broad Band SSB exciter at the Chicago Parts Show in May. This unit, scheduled for production in a couple more months, has some very intriguing features. The broad band system makes for a much simpler front panel . . . there are just five controls: 1) an emission switch which selects cw-pm-fsk-dsb-ssb/upper-ssb/lower-am-am/upper only-am/lower only. 2) meter switch. 3) VFO tuning control, fine and rapid tuning. 4) band switch. 5) Off-manual-standby-VOX switch. All the other necessary controls are behind the little doors since they are of the "set-'em and forget-'em" variety. The rig runs quite a bit more power than other exciters and makes quite a fine little rig all in itself. Notice that a 2″ scope is built right into the rig, an excellent innovation since a scope is almost mandatory for checking on SSB rigs.



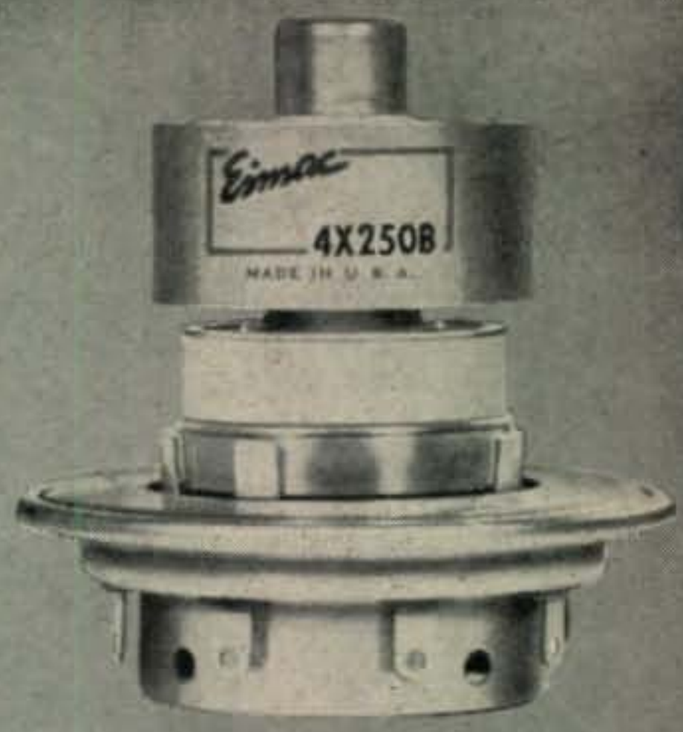
Central Electronics new exciter.



4-65A

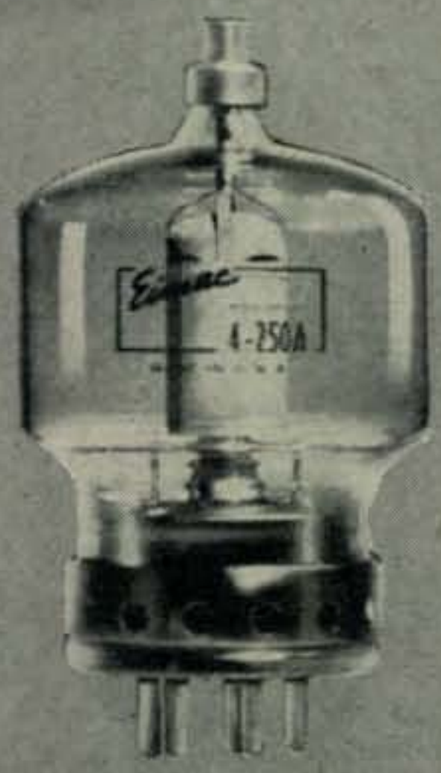
4-400A

4 E27A



4X250B and air system socket

4-125A



4-250A

4CX300A

CW

SSB

AM

Eimac First...for all band transmission

4-65A Radial-Beam Power Tetrode

Smallest of the Eimac internal anode tetrodes, the 4-65A has a plate dissipation rating of 65 watts and is ideal for deluxe mobile as well as fixed-station service.

	CW	AM	SSB
Plate Voltage	3000v	2500v	3000v
Driving Power	1.7w	2.6w	0
Power Input	345w	275w	195w

4-400A Radial-Beam Power Tetrode

Highest powered of the Eimac Big Six, it will easily deliver a kilowatt per tube in CW, AM or SSB application. Forced-air cooling is required.

	CW	AM	SSB
Plate Voltage	3000v	3000v	3000v
Driving Power	6.1w	3.5w	0
Power Input	1050w	825w	900w

4E27A Radial-Beam Power Pentode

The 4E27A gives outstanding performance in all types of operation. When suppressor-grid modulated, it will deliver 75 watts at carrier conditions.

	CW	AM	SSB
Plate Voltage	2500v	2500v	3000v
Driving Power	2.3w	2.0w	0
Power Input	460w	380w	345w

4X250B Radial-Beam Power Tetrode

A compact, rugged tube unilaterally interchangeable in nearly all cases with the famous 4X150A, with the advantages of higher power and easier cooling.

	CW	AM	SSB
Plate Voltage	2000v	1500v	2000v
Driving Power	2.8w	2.1w	0
Power Input	500w	300w	500w

4-125A Radial-Beam Power Tetrode

The versatile tube that made screen grid transmitting tubes popular. This favorite for commercial, military and amateur use is radiation cooled.

	CW	AM	SSB
Plate Voltage	2500v	2500v	3000v
Driving Power	3.8w	3.3w	0
Power Input	500w	380w	315w

4-250A Radial-Beam Power Tetrode

A high power output tube with low driving requirements. A pair of Eimac 4-250A's easily handle a kilowatt input in AM, CW or SSB service.

	CW	AM	SSB
Plate Voltage	3000v	3000v	3000v
Driving Power	2.6w	3.2w	0
Power Input	1035w	675w	630w

4CX300A Ceramic Power Tetrode

A new all ceramic-metal high power tetrode designed for rugged service. Will withstand heavy shock and vibration and operate with envelope temperatures to 250° centigrade.

	CW	AM	SSB
Plate Voltage	2000v	1500v	2000v
Driving Power	2.8w	2.1w	0w
Power Input	500w	300w	500w

Information on Eimac tubes and their applications is available free upon request from our Amateur Service Bureau. Write today for copies of our Quick Reference Catalogue, Application Bulletin No. 8 "Power Tetrodes," Application Bulletin No. 9 "Single Sideband," and other valuable literature.

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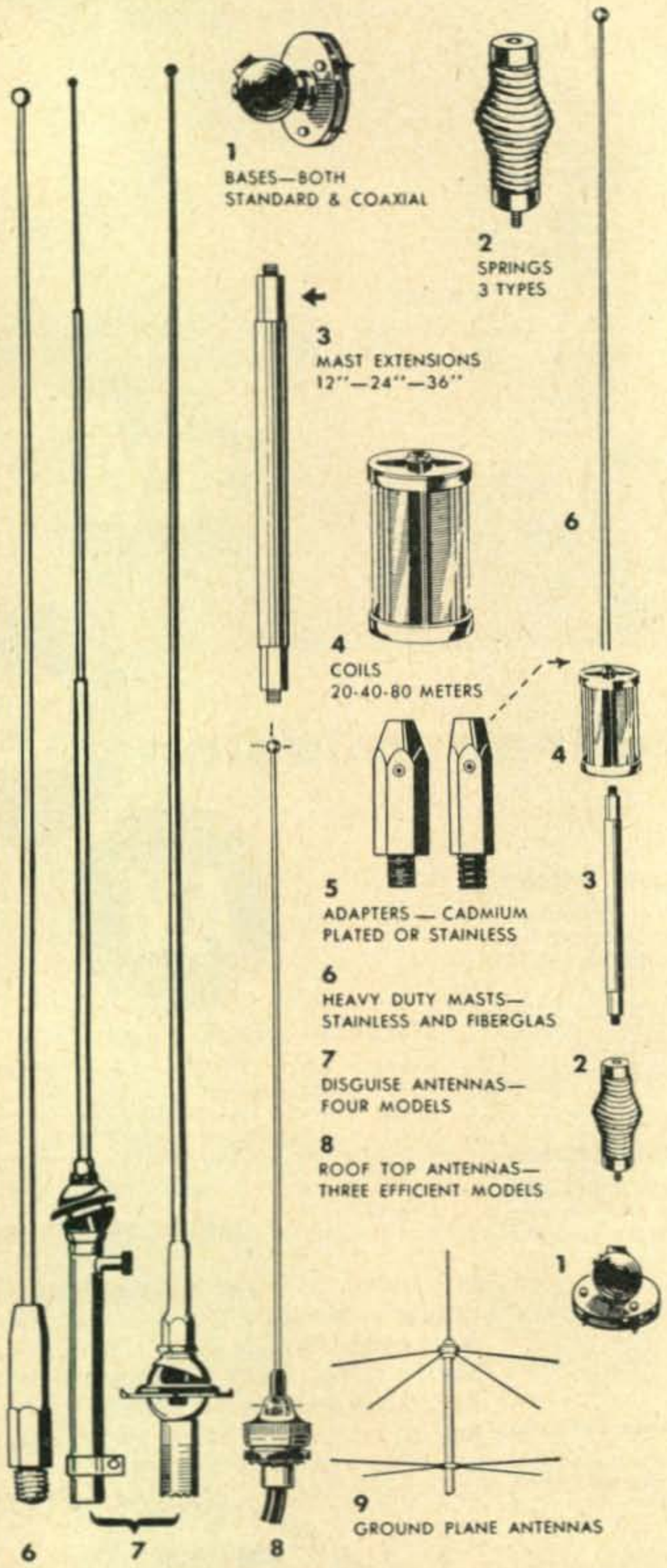
Eimac

For further information, check number 12 on page 126.

NEW complete line for communication

WARD ANTENNAS

Pioneer antenna maker now adds new bases, new masts, new springs and coils for all your requirements . . . in all price ranges.



See distributor or write for newest catalog

Ward PRODUCTS CORPORATION
A division of THE GABRIEL COMPANY
Dept. CQ — 1148 Euclid Ave. — Cleveland 15, Ohio

In Canada: Atlas Radio Corp., Ltd.
50 Wingold Ave., Toronto, Ontario

For further information, check number 13 on page 126.

We'll try to have more on this exciter when it comes out this fall.

Oh, as a special note for anyone who doesn't know what broad-banding is: all you tune is the band switch and the VFO, everything else is all in tune over the whole band . . . you don't have to tune plate and grid circuits.

13 Per

Several Technicians have written suggesting that Eleven Meters be opened for Techs, thereby assuring activity on the band and affording the Techs a DX band to play with. The argument, on first hearing, seems to have merit. But I feel that we would be doing a dis-service to the Techs if such a move were made.

At the risk of being stoned at the next hamfest I would like to explain my thoughts about the code. My own code speed is miserable . . . I admit it . . . but then I have always been a "phone" man. Every now and then I am forced to resort to cw to get through somewhere on a schedule or to get hold of some station that doesn't work phone and the experience is a trial for all concerned. This is laziness and I have no other excuse. If I took a few weeks out to practice up I could do pretty well.

But am I against the code? Not a bit. I look upon cw as an important hurdle on the road to hamdom, one which all of us have in common. It is difficult for everyone and impossible for practically no one. It separates the men from the boys. Whether we use it or not later on it represented a difficult goal that we all have had to conquer before we could "join the fraternity."

Neglecting the hurdle aspect of the code for a moment we still find that it is important as a means of emergency communications. It has been proposed by serious people that all school children be taught the code so that they would have it available to help them in time of need. I go along with this. In the meantime it certainly behooves us to make sure that every amateur knows the code. When the emergency comes up it will have been well worth the time and trouble necessary to teach hundreds of people the code just to have one available in the right spot.

One black night during the war we were making a radar approach on another submarine and were just about ready to shoot. No other U.S. submarines were supposed to be within a hundred miles of there so we were going in for the kill. Just before we let loose with our torpedoes I noticed coded patterns of radar interference appearing on the 'scope which spelled out the recognition signals of the day. I keyed the radar transmitter and returned the recognition signals. Both of us breathed a sigh of relief and put away the

[*Continued on page 110*]

HQ-100 **General-Purpose Communications Receiver** — Ten tube superheterodyne with automatic noise limiter. Continuously tunable from 540 KCS to 30 MCS. Electrical bandspread tuning. Q-Multiplier. High sensitivity. Auto-Response automatically adjusts audio bandpass.

$169.00*

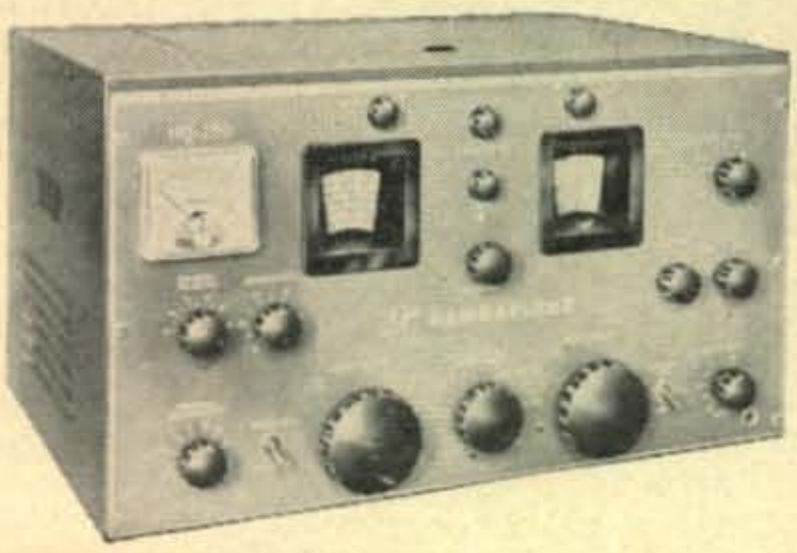
*Clock-timer $10.00 extra

EVERY ONE . . . A HONEY FOR THE MONEY!

HQ-110 **Amateur Communications Receiver** — Dual conversion superheterodyne with automatic noise limiter. Covers 6, 10, 15, 20, 40, 80 and 160 meter amateur bands. Separate SSB linear. Q-Multiplier. Crystal calibrator. Separate stabilized BFO. Crystal control. Auto-response.

$229.00*

*Clock-Timer $10.00 extra



HQ-150 **Professional-Type Communications Receiver** — Continuously tunable from 540 KCS to 31 MCS. Only receiver to offer selectivity of Q-Multiplier and Crystal Filter. Electrical bandspread. Crystal calibrator. 13 tube superheterodyne with noise limiter. Extremely stable BFO. Uniformly high sensitivity. Extra-high signal-to-noise ratio.

$294.00

HC-10 **SSB/CW or AM/MCW Converter** — Works with any receiver having IF between 450 KCS and 500 KCS. Takes seconds to connect. Complete self-contained audio system and power supply. Tuned IF with seven selectivity positions. Vernier type tuning. Razor-sharp slot filter, adjustable over passband.

$149.00

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For further information, check number 14 on page 126.

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PHASEMASTER II
The ultimate for SSB, a complete self contained 75W PEP Output Transmitter.
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Companion VFO to PM II unexcelled stability, 100:1 Gear Dial Drive, all band operation
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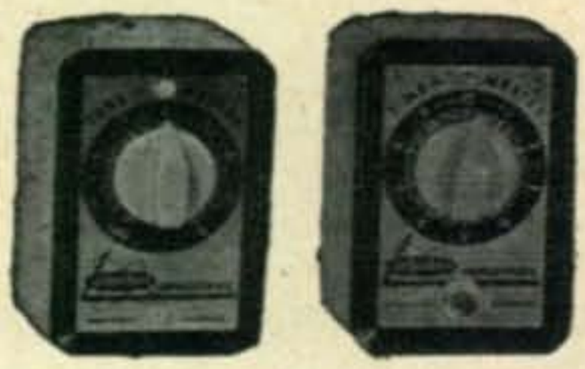

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Lakeshore INDUSTRIES

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MANUFACTURERS OF PRECISION ELECTRONIC EQUIPMENT

For further information, check number 15 on page 126.

Letters . . . to the editor

Then and Now

Dear OM:

It is a dog-gone funny thing why and how people get bitten by the radio bug. There is also no accounting for the virulence of the disease. I can well remember back in 1910 seeing my first wireless station in operation, the old Clark Wireless Company's station in downtown Detroit. That was the first exposure. The second was the United Wireless Station at the foot of the West Grand Boulevard in Detroit. The operators were Ross Keever and Chuck Beals. Those were the "happy" days when commercial rivalry was intense in the Great Lakes area, and stories were rampant that on at least one occasion one of the operators left a brick on his key to jam the rival station during the noon hour.

As I recall the progress of the virus during those years, I got my first spark coil rig on the air early in 1911. An E. I. Company's electrolytic interrupter provided the dc current and plenty of exercise replacing blown fuses in the house circuit. Also along about this time the Marconi Company bought out the United Wireless Company stations, and the Clark Company folded up.

I wish that I could recall the names and call letters of the many amateurs in the area and would give a great deal to hear from my old cronies. Among the few I do recall was Edward Lansing, a real genius and pioneer in the construction end of the business. Then there was MS—Marshall—in Detroit, CY, who later got the call 8CY, was another fine mechanic, who built all of his own equipment and found time to help others out. Doc Bessler of River Rouge has recently passed on to ham-heaven, Lester Ilgenfritz of Detroit became first trick operator on the old City of Detroit II, and I got the princely sum of $60 a month as second operator on the same D & C Company ship.

Memory is apt to play tricks at age sixty, but I still remember my 1 kw rotary spark gap rig with a good deal of pleasure. That rig came about in 1912 and gave good service until World War I put an end to my radio activities for a period of thirty eight years. Listening to the pandemonium on 40 these days makes me wish for the thrill of listening on 200 meters in the old days when signals were few and QRM was practically non-existent. Those of you who recall the tone of the best rotary spark gap signals will also join with me in regretting the passing of an era. NAA and NAR were DX back in those days, and my first QSL came from the college station at Amherst, Mass., in 1913.

For a time I was the proud owner of the old Marconi station wireless shack. Dad and Mother saw that I was an incurable case and bought the little building for me and had it moved to our home at 301 West Forest Avenue in Detroit after the Marconi Company's tower blew down. It was about 10 by 12 feet in size, as I recall it, and sheathed with corrugated iron. When the 1 kw transmitter was turned on, beautiful sparks could be drawn to the fingers of any one touching the side of the building with surprising results. I am sure that the neighbors loved me since the habits of hams remain unchanged from that day to this, and I frequently woke them up at all hours of the night calling CQ—W8DG, my call at that time.

Then, as now, the coffee pot was kept simmering on the little wood stove that heated the shack in winter. Friends dropped in and shared the fun. Silicon, galena, and pyrites were the crystals favored in our cat-whisker detectors; and the loose coupler replaced the older tuning coil with two sliders.

Out in Ann Arbor at the University, an employee named Berglund had got hold of one of the DeForest audion tubes, and we made several trips there to watch

[*Continued on page 98*]

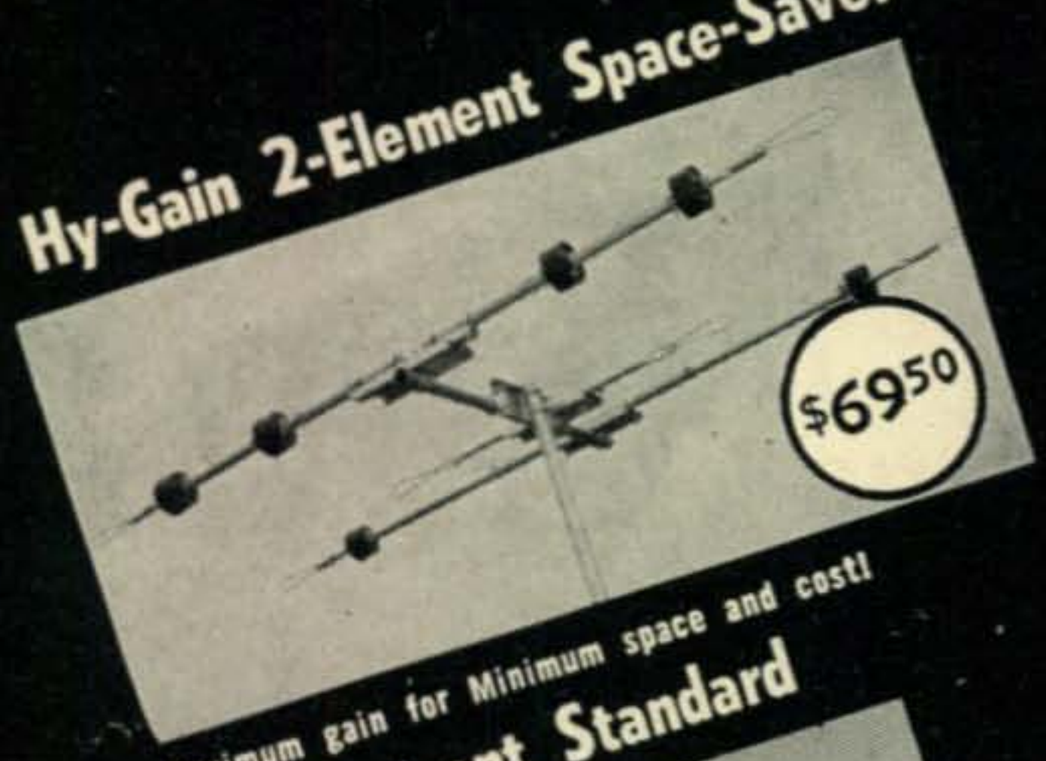
YOU PAY ONLY 10% DOWN ON THESE "IN-STOCK"

HY-GAIN *Triple Spanner* BEAMS

FROM

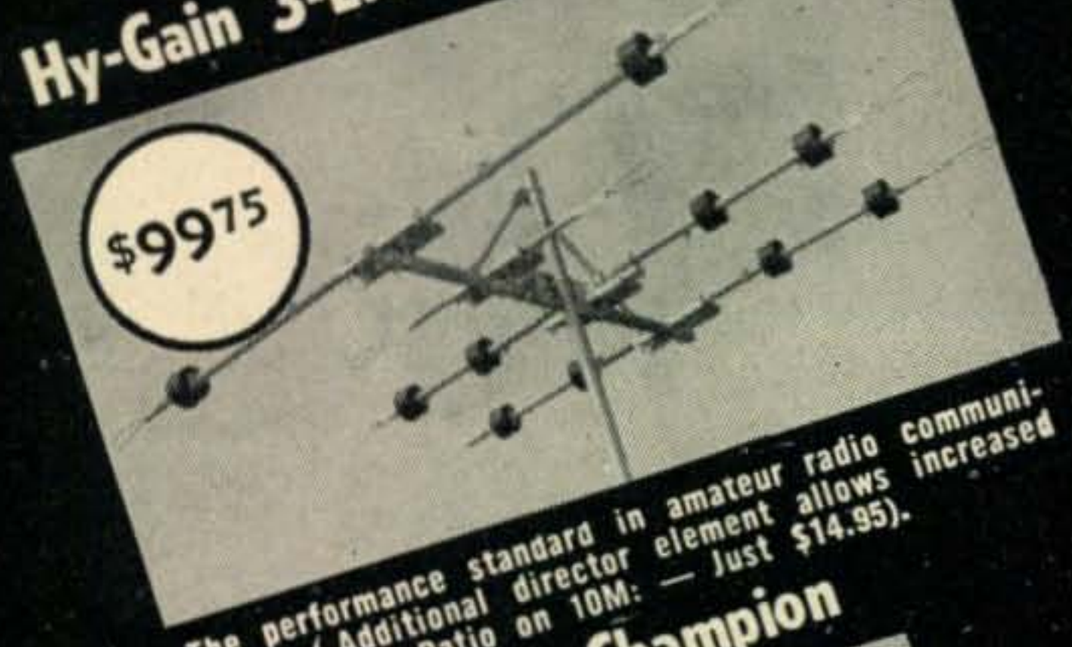
"The World's Largest Distributor of Amateur Radio Equipment!"

Hy-Gain 2-Element Space-Saver



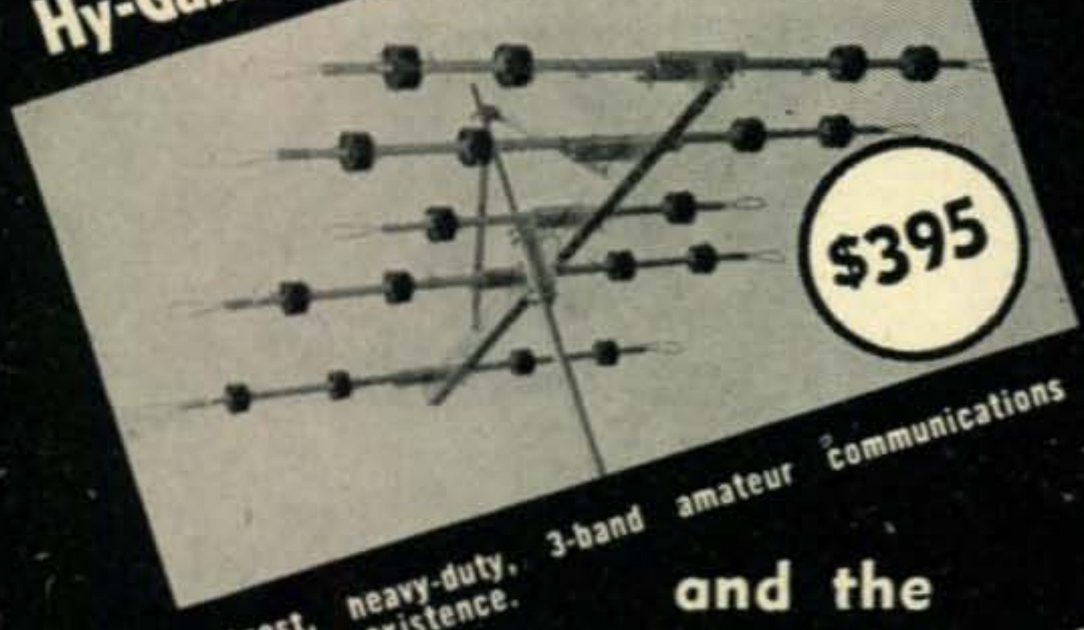
Maximum gain for Minimum space and cost!

Hy-Gain 3-Element Standard



The performance standard in amateur radio communication. (Additional director element allows increased gain in F/B Ratio on 10M: — Just $14.95).

Hy-Gain 5-Element Champion



Finest, heavy-duty, 3-band amateur communications array in existence.

Hy-Gain Rotatable Di-Pole

Three-Band performance at lowest cost!

Incorporates Sensational New *Insu-Traps*

the only weatherproof, adjustable trap circuits in existance . . . used in all Triple Spanners, and acting as insulators for selected frequencies, isolating the various element sections at 10, 15 and 20M.

- One beam, one feedline, three bands (10, 15 & 20M), and low SWR.
- Guaranteed for one year against any defects in material or workmanship.
- Better performing than three stacked arrays because interaction and de-tuning effect is eliminated.
- May be erected in extremely short time; no adjustment necessary; no test equipment needed.

There are now more Hy-Gain Triple Spanners in use than all other Tri-Band Beams *Combined!*

INSIST ON A GENUINE

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and the complete line of hy-gain ANTENNA PRODUCTS!

SEND FOR COMPLETE BROCHURE TODAY . . .

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For further information, check number 16 on page 126.

Is a Degree Essential for an Electronic Engineering Career?

"Student" Fred Gunther in the IBM school

Fred Gunther has no degree. Yet, today, at IBM, Fred is a Technical Engineer working on America's biggest electronics project. His story is significant to every technician who feels that lack of formal training is blocking his road to the top.

Let's go back to 1950 and watch Fred Gunther, at 18, as he goes about the business of determining his life's work. Fred spent almost a year trying his hand at various jobs. None of these turned out to be the one that Fred wanted to devote his life to. So, still undecided about his career, Fred entered the Navy for a four-year hitch.

Fred learned something very valuable in the Service, as have many other men who eventually discover the electronics field. His aptitude tests revealed him as an excellent electronics prospect, and he received ten months' training in electronics fundamentals and radar. Upon his discharge in 1955, he was an Electronics Technician, First Class.

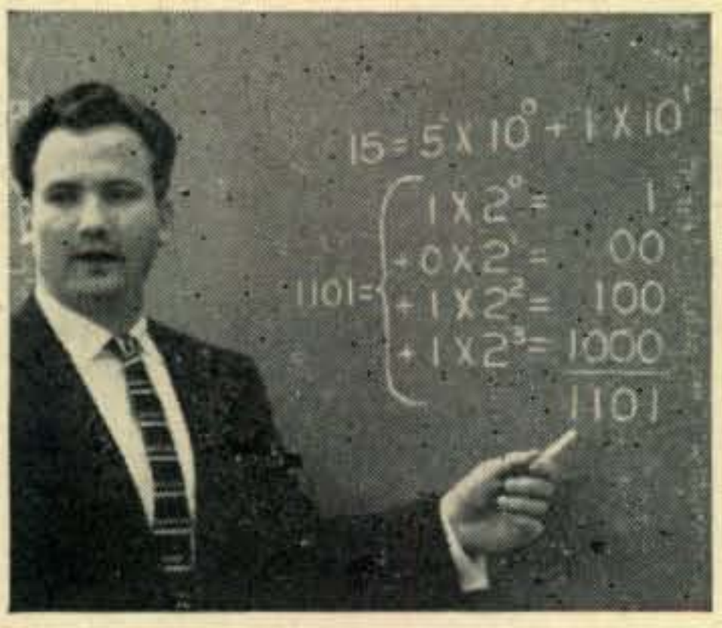
Something even more important to Fred's career occurred during his Service hitch. He began to hear such terms as "automation" . . . "data processing" . . . "electronic computer." "Then, one evening, while glancing through the paper," he recalls, "I spotted a story about *Project SAGE.*"

What is Project SAGE?

SAGE means Semi-Automatic Ground Environment. It is part of America's radar warning system—a chain of defense that will ultimately ring our country's entire perimeter. At the heart of this system are giant electronic computers, which digest data filtered in from Texas towers, picket ships, reconnaissance planes, ground observers. The computers analyze this information for action by the Strategic Air Command and other defense units. Largest in the world, each contains perhaps a million parts—occupies a city block. They are built for the Project by IBM.

Fred joins IBM

SAGE fascinated Fred, for it embodies the most advanced electronic concepts. And, when he learned that IBM would train him for six months, at full salary, plus a living allowance, to become a Computer *Units* Field Engineer, he seized the opportunity. Fred started his new electronics career in the IBM school, with twenty other technicians. He attended classes 8 hours a day. Courses consisted of some 20 subjects—computer circuitry and units, maintenance techniques—everything he would need to become a full-fledged Computer *Units* Field Engineer.



Answering instructor's questions

At the operating console of the computer

Home to the family, Pemberton, N. J.

Assigned to McGuire AFB

His six months' training completed, Fred was assigned in May, 1956, to McGuire Field, where the first of the giant SAGE computers is located. Here he assisted in the cable installation for this vastly complicated electronic giant. He helped to set up the computer, interconnect its many sections, check it out and make it ready.

Becoming a Computer Systems Engineer

"I like to think it was due to my interest and grade of work," Fred says, "but at any rate, last October I was invited to return to Kingston for further training—to become, in fact, a Computer *Systems* Engineer. Naturally, I was pleased, for this training would give me a chance to assume actual engineering responsibility." Fred completed the Computer Systems course. After several months of outstanding work in his new capacity, he received a *third* promotion—to Technical Engineer—in a field engineering liaison group.

What does the future hold?

What does the future hold for Fred Gunther, now that he has become a Technical Engineer? Fred says, "With my IBM training back of me, the future sure looks good. I've advanced from Radar Technician to Computer *Units* Field Engineer to Computer *Systems* Engineer to Technical Engineer *in two years*—and received a valuable electronics education besides!"

How about YOU?

If you have 2 years' technical schooling—or equivalent experience—IBM will train you for 6 months as a *Computer Units Field Engineer.*

If IBM finds your experience equivalent to an E.E., M.E., or Physics degree, you receive 8 months' training as a *Computer Systems Engineer.*

After training, you will be assigned to an area of your choice within the United States. You receive *salary*, not wages, plus overtime pay. In addition, every channel of advancement in the entire company is open, and IBM is a leader in a field that is sky-rocketing in growth. And, of course, you receive the famous IBM company-paid benefits that set standards for industry.

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TIME EQUIPMENT

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For further information, check number 17 on page 126.

How to Eliminate Guesswork on Your Transmitter to Antenna Match

The CoAx Ratiometer

The CoAx Ratiometer is a new SWR indicator that shows you your standing wave ratio at all times. It can be permanently installed in the line to any coax-fed antenna or antenna tuner.

New design principle permits these advantages:

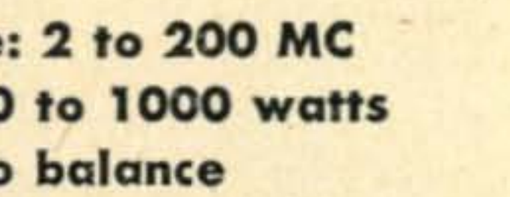
- **frequency range: 2 to 200 MC**
- **power range: 10 to 1000 watts**
- **no condensers to balance**
- **no resistors in line to dissipate power**
- **rugged • foolproof • compact**
- **full one year guarantee**
- **52 or 72 ohm**

Model KW4-M

includes CoAx unit, combination switch box and meter and universal mounting bracket

$45.00

Model KW4



includes CoAx unit, switch box without meter (use 0-100 μa) and universal mounting bracket

$27.50

See your local distributor. If he doesn't have the CoAx Ratiometer, send us his name and your check. We'll ship direct to you, postpaid.

UNIVERSAL SERVICE

114 N. THIRD ST., COLUMBUS 15, OHIO

For further information, check number 18 on page 126.

Contest Calendar

Frank Anzalone, W1WY
14 Sherwood Road
Stamford, Conn.

October	5-6	VK/ZL—Phone
October	12-13	VK/ZL—CW
October	26-27	CQ W.W.—Phone
Nov. 30-Dec. 1		CQ W.W.—CW

W.I.A. VK/ZL

This year the VK/ZL contest is conducted by the Wireless Institute of Australia. The scoring system has been changed to that used in the RSGB contests, therefore it is suggested that the rules be studied closely.

Object: For the world to contact as many VK/ZL stations as possible.

Time: Phone—1000 GMT, Saturday, Oct. 5th to 1000 GMT, Sunday, Oct. 6th. CW—1000 GMT, Saturday, Oct. 12th to 1000 GMT, Sun., Oct. 13th.

Divisions: Three separate sections.

1. Phone, transmitting.
2. CW, transmitting.
3. Phone and CW, receiving.

Rules: 1. All amateur frequency bands may be used, but cross-band operation is not permitted.

2. Only one contact per station per band is allowed.

3. Only one operator per station. Two or more operators at any particular station will be considered as separate competitors and each must therefore submit a separate log under his own call.

Serial Numbers: The usual five or six figures with the last three digits indicating the number of the contact. However this number can begin with any figure between 001 and 100 for the first contact.

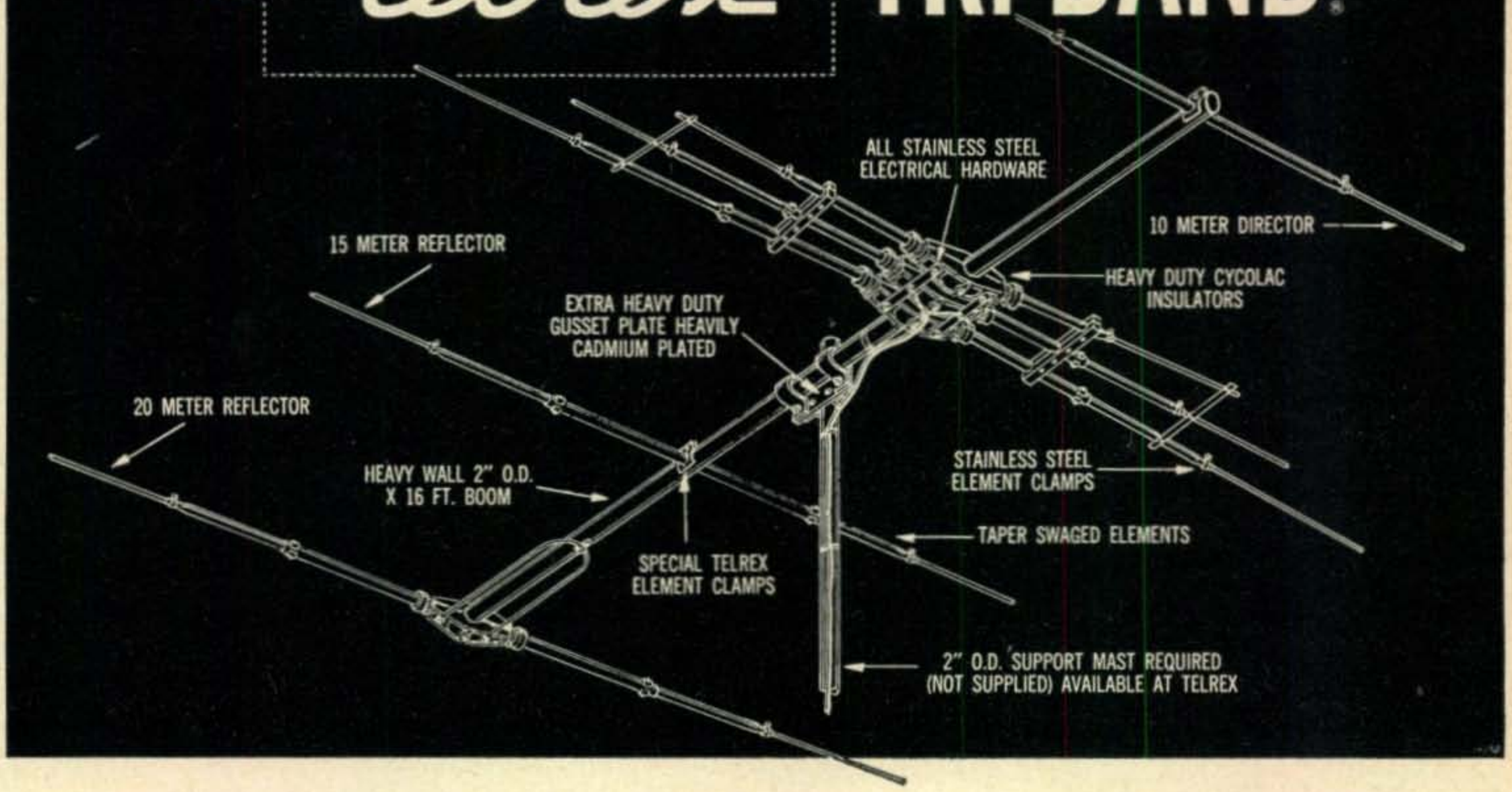
Scoring: Five points for each contact on each band. An additional bonus of 50 points will be gained each time a new call area, VK or ZL is worked.

Awards: Certificates to the highest scorer in each country and each call area in VE, W and ZS. The Committee may award additional certificates in areas where the returns are high.

Receiving Section: Rules and scoring are same as for the transmitting section. However this section is only open to SWL members. Logs must show the call letters of the station heard, the serial number sent by it, and the call letters of the station being worked. It is not sufficient to only log a CQ. Sign the usual declaration and send logs not later than Oct.

[*Continued on page 103*]

NEW telrex "TRI-BAND"



3-BAND, 1-TRANSMISSION LINE SYSTEM WITH 2 WIDE-SPACED ELEMENTS ON EACH BAND PROVIDING

Genuine 3-Band Results Without Compromise!

Destined to become the "Standard of Comparison"! Tri-band one transmission line system, totalling 40 lbs. of educated aluminum, is calibrated for easy assembly to our specifications at your site, without fuss or bother. No condensers to breakdown, or fuss or fume with. No formulas! Simply assemble to our calibration chart, for outstanding performance per element, per dollar at your site! And . . . each band can be set to the portion of the band you desire without affecting the performance of the other two bands!

MECHANICAL AND ELECTRICAL SPECIFICATIONS

Special Telrex Tri-Band "fanned" dipole resonated and matched for single line 52-ohm feed, with wide-spaced director on 10 meters (forward of the 15 and 20 meter sections); wide-spaced reflector on 15 meters; wide-spaced reflector on 20 meters. 2-elements *full size* on the 3-bands for full size performance on the 3 bands. One-boom, no interlacing, no compromise and 5.5 db gain or better, on each band! F/B ratio 19 db or better, on each band! V/S/W/R 1.2/1 or better, on each band! Rugged all-aluminum 75 mph hurricane force construction! Boom, dural—2" O.D. x 16 ft. Elements taper swaged 1", ⅞" and ½" O.D. Stainless-steel airplane element clamps. Borg-Warner Cycolac insulators. Special heavy-duty gusset plate mounting provided for attachment to 2" O.D. mast support! Antenna will handle 2.5 KW, or better, on the 3 bands! Can be rotated by Telrex R-100S rotator, price ($158.75) in winds up to 65 mph —and will not pinwheel or breakdown at any wind velocities. Telrex R-200-S rotator will handle in any wind velocity!

Approx. weight:	40 lbs.
Longest element length:	32'-10"
Turning radius:	18 ft.
Wind area at 100 mph:	4.91 sq. ft.
Wind load at 100 mph:	151 lbs.

NOTE: For the amateur who wants to use a "balun" at the antenna, a broad-band "balun" will be available shortly at $27.50, f.o.b. Asbury Park, New Jersey.

SPECIAL NOTE: A heavy duty C-D TV rotator should handle up to 30 mph—probably will pinwheel and may become inoperative at higher wind velocities!

Order from your distributor or write

TELREX LABS

for information on this or other models designed to outperform!

telrex LABS.
COMMUNICATION & TV ANTENNAS SINCE 1921

Available for immediate delivery

Price $158.00

f.o.b. Asbury Park, New Jersey

ASBURY PARK 42, NEW JERSEY, U.S.A. Tel.—PRospect 5-7252

For further information, check number 19 on page 126.

Hamfests

Montana

The Twenty-second Annual Glacier-Waterton International Peace Park Hamfest will be held July 20th and 21st at Apgar Camp grounds, on the edge of Lake McDonald, in Glacier National Park, Montana. Many valuable prizes to be awarded by drawings and contests. Bring the family. We are going to have fun in the Montana Rockies. Trailer space, camping, and cabins available. Further information write Frank B. Hart, W7UPR, Route 1 Sunset Drive, Kalispell, Montana.

North Dakota

Six operators of the Napoleon, North Dakota vicinity are sponsoring the *NAPOLEON HAMFEST*, to be held July 14, 1957, at Beaver Lake State Park, Burnstad, North Dakota. No registration or banquet fees. Displays, talks, picnic lunch, swap table, prizes. The main idea is to get the fellows together for a good time, and we think this is the place to do it. For detailed information write to WØKLP, Napoleon, North Dakota. VACATIONERS — make this event a highlight of your trip this summer. Just 35 miles off the main Northern route to Yellowstone National Park.

Indiana

The Turkey Run V.H.F. Picnic will be held on July 28, 1957 at Turkey Run State Park, Indiana. Registration begins at 9:00 a.m. Bring your lunch and enjoy the day with us. Games for the ladies; swap table and prizes as usual. Sponsored by the Wabash Valley Radio Club.

Aha, San Antone

The Annual West Gulf Convention will be held July 26-27-28 in San Antonio (Gunter Hotel). All sorts of entertainment is scheduled . . . special ladies activities, including introduction to well known bachelor magazine editor; prizes, luncheons, displays, meetings, banquet, dance, transmitter hunt, and rather longish illustrated talk by W2NSD. Registration is $9.50. All amateurs from Texas, New Mexico, Oklahoma, Louisiana and nearby states are expected to come and bring their families. The chap on the hoss with the subscription blanks is the CQ editor, bring money for him. This is a CQ approved convention.

San Gabriel

The Ramona Radio Club of San Gabriel will hold its annual Hamfest and picnic from 10 a.m. to 4:30 p.m. July 28 in Barnes Park, McPherrin and Newmark Avenues, Monterey

[*Continued on page 116*]

SUPERIOR GEAR—FROM THE SSB PIONEER

MULTIPHASE 20A EXCITER
Now Better Than Ever

The "Work-Horse" of SSB. It's a fact — there are **More 20A'S** on the air than **all other makes combined!** 20 watts P.E.P. output on SSB, DSB, AM, PM & CW. Perfected voice-controlled break-in. Band switched 160-10 meters. Increased stability — improved linearity — higher output on HF bands, versatile, dependable, reasonably priced. Quality thru and thru.

Wired and Tested.....$249.50 Complete Kit.....$199.50

MULTIPHASE 600L

Broad-band linear amplifier for SSB, DSB, AM, PM & CW. **No tuning controls of any kind!** Single knob band-switching 10 to 160 meters. A 20A easily drives it to 500 watts DC input. Single 813 in high efficiency class AB2. Built-in regulated power supplies. Exclusive meter reads watts input, RF AMPS & SWR. TVI suppressed — parasitic free.

Complete Ready to Operate.....$495.00

MULTIPHASE MM-1 RF ANALYZER

What's your signal really like? Hook in an MM-1 and stop guessing! 3" scope instantly shows up flat-topping, improper bias, incorrect loading, etc., and how to correct them. SSB or AM—5 watts to 5KW—1MC to 55MC—take your pick of envelope, trapezoid or bow-tie patterns. Built-in 1KC oscillator for complete alignment of SSB exciters.

Wired and Tested.....$129.50 Complete Kit.....$99.50

A POSTCARD BRINGS YOU INFORMATION ON ALL MULTIPHASE GEAR.

MULTIPHASE EQUIPMENT

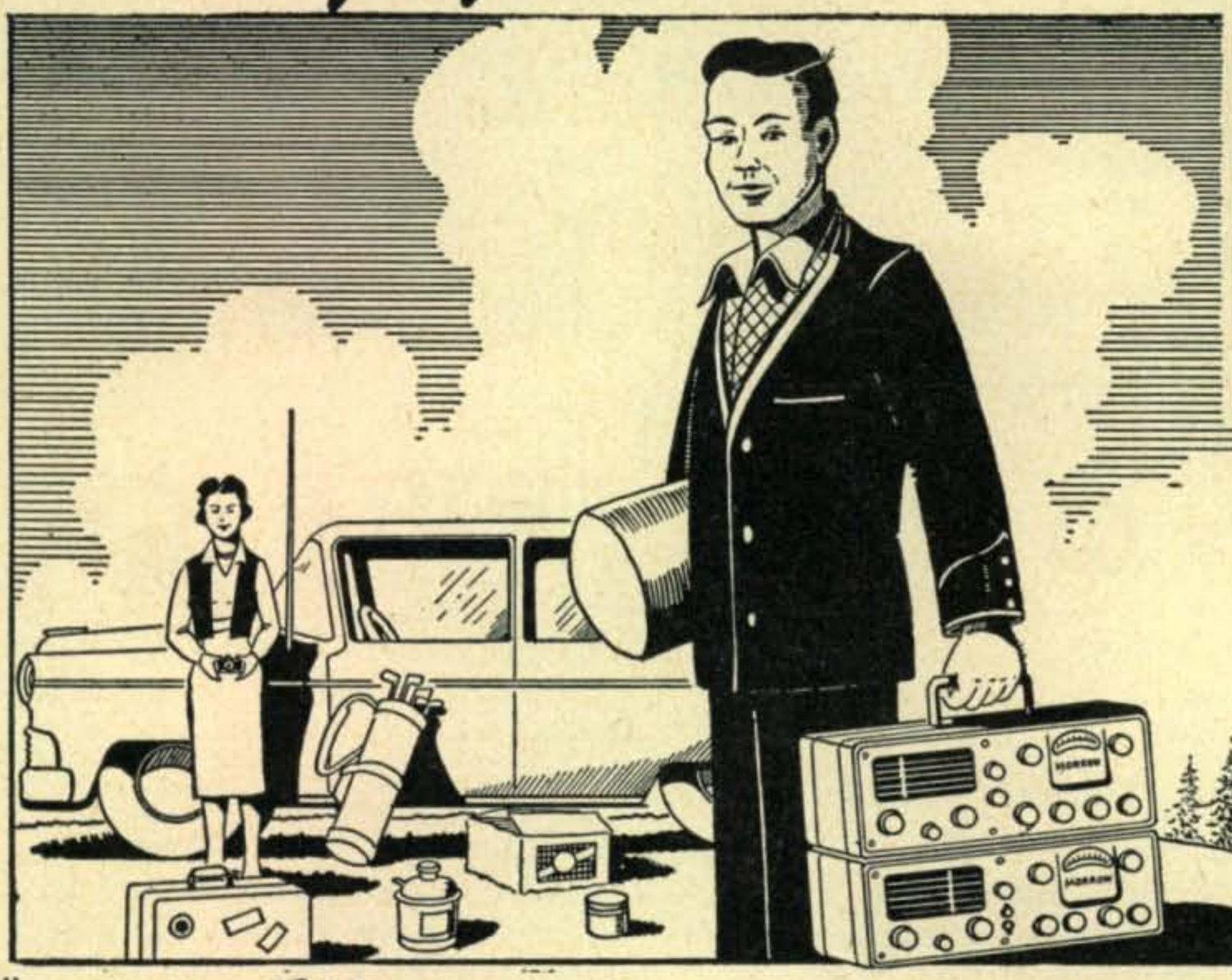
Central Electronics, Inc.

1247 W. Belmont Ave. Chicago 13, Illinois

For further information, check number 20 on page 126.

THIS YEAR...

Enjoy a Morrow Vacation!



Take ***Morrow*** along, too, and have a wonderful vacation. Do your hamming enroute and also use as a portable station. Please the XYL by working the home QTH.

MB-560A:	**60-watt Transmitter,** built-in VFO and modulator	$214.50
MBR-5: or **FALCON:**	**Deluxe Receiver,** S meter, 100 KC crystal standard, noise balance squelch	224.50
	Receiver with Broadcast Tuner as an accessory, serves for Conelrad Monitor, selective bandpass: narrow 2.8 KC, broad 9.2KC; with BCT	189.00
	MBR-5 and Falcon have 1 microvolt sensitivity for 16db signal to noise ratio on 10 meters, excellent frequency stability.	
TV-600:	**High Voltage Vibrator Power Pack,** 600 volt, 200 ma, features silicon rectifiers	79.50
RVP-250:	**Vibrator Power Supply** for receiver and exciter of transmitter	39.95
CBM6 or 12:	**Cable** for interconnecting above units	9.95
MK-N1:	**Modern Cylindrical Microphone**	16.95
MLV-50:	**Remote Control Antenna Tuner**	24.95
SH-7:	**Speaker** for mobile installation	11.50
RTS-600S:	**AC Power Pack** with speaker for portable use of MB-560A and either MBR-5 or Falcon	107.50
CBF7-7 / **CBF8-8**	**AC Cable** for RTS-600S	9.95

All Prices Are Amateur Net

Prices and specifications subject to change without notice.

SEE YOUR JOBBER

QUALITY AND PERFORMANCE

MORROW

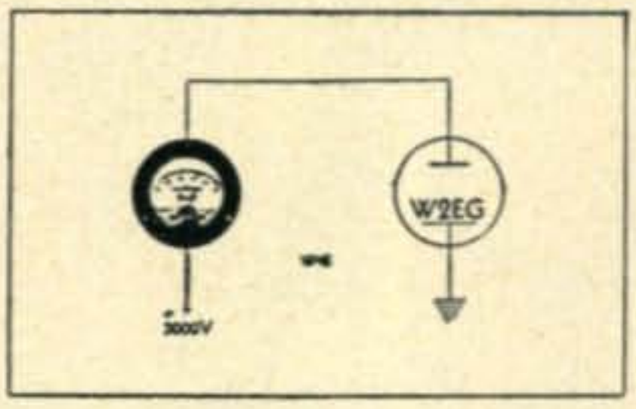
radio manufacturing co.

2794 Market St. Salem, Ore.

For further information, check number 21 on page 126.

QSL Contest

We had all losers this month, except K2YOF. Again next month we expect to have the same miserable situation: all losers, but one. Will yours be the one? Probably not . . . but give it a chance by sending it in. Prize (?) is a two year extension to CQ. Losers this month are K4KRR, W2EG, and W7GQH, all with real nice cards.



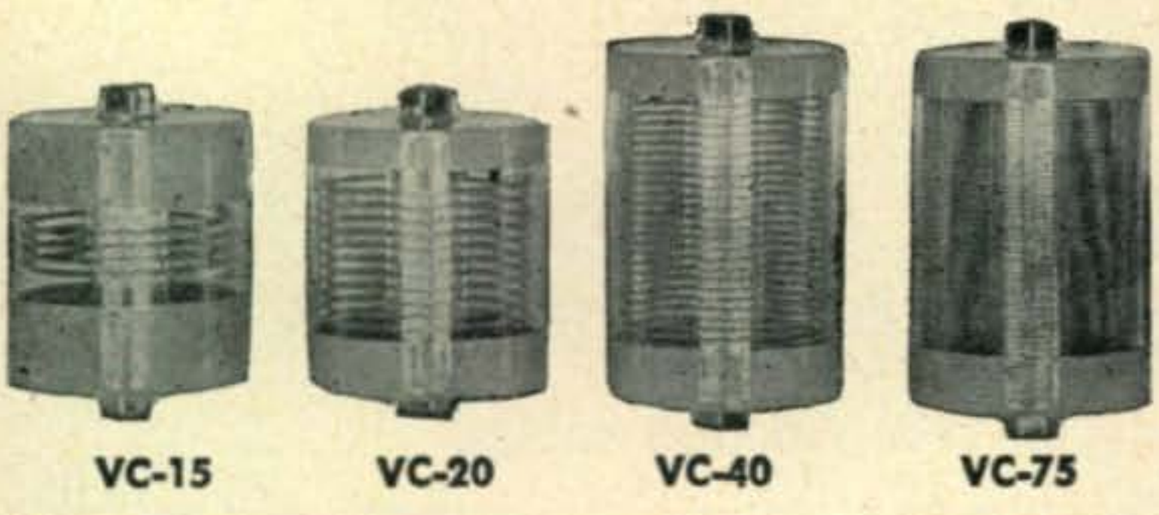
Docket 11994

The demise of Eleven Meters has been delayed a bit. The FCC has announced that the deadline for receiving comments has been extended to September 3rd. This will give get your ideas down to Washington to the those of you who forgot to write a chance to FCC (Washington 25) and your congressmen. This will also give us a better chance to prepare the results of the Save Eleven Contest of June 8-9 for presentation to the FCC. Hope you sent in *your* log. Over a hundred logs were received by Tuesday after the contest.

BASSETT VACUUM ANTENNA COILS

(Pat. Pend.)

PROVEN PERFORMANCE! EXTREMELY HIGH "Q"!



VC-15 VC-20 VC-40 VC-75

- The only genuine hermetically sealed antenna loading coils.
- Evacuated and filled with pure helium.
- Impervious to rain and weather. Always super efficient.
- Unconditionally guaranteed.

Fiberglas top rods
Anodized base rods
Mobile base mounts

Also Bassett All-Band Vacuum Coil Model VC-1075 Covering All Bands 10, 15, 20, 40 and 75.

Write Us For Brochure and Pricing Information.

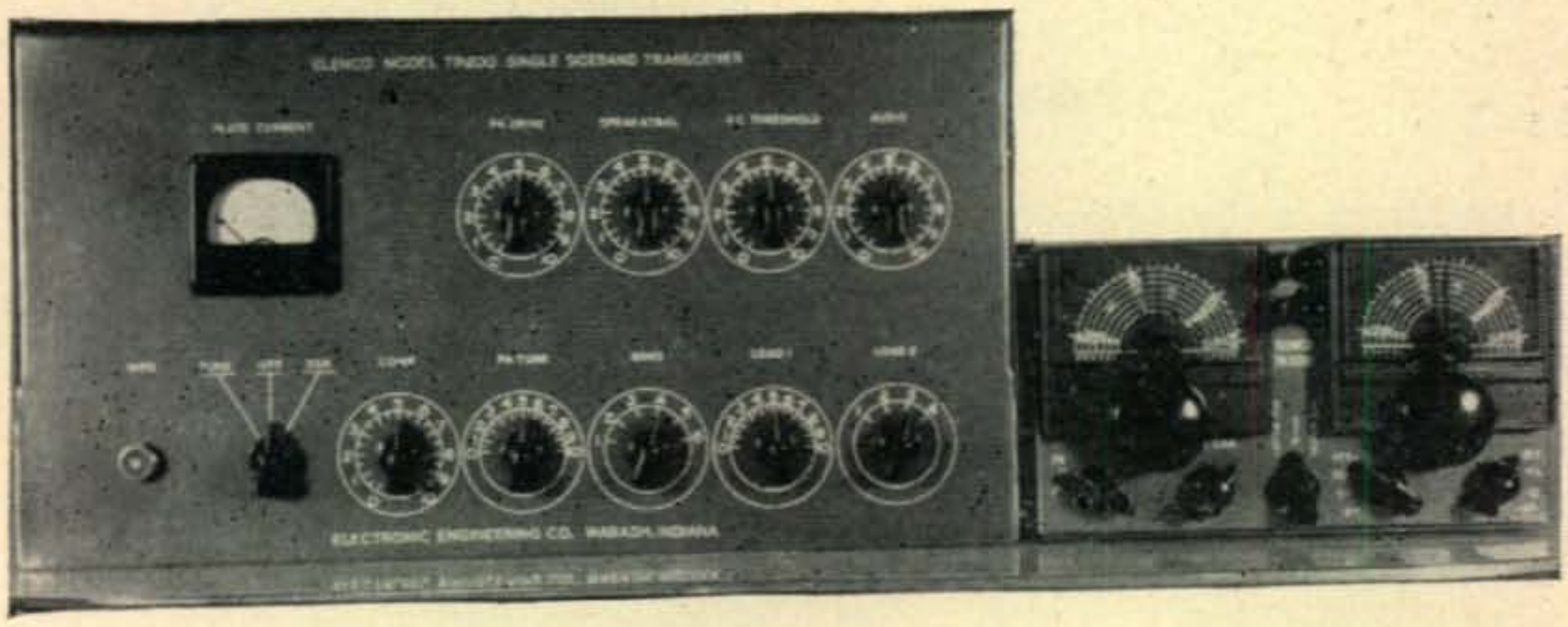
REX BASSETT, INC.

Bassett Building **Fort Lauderdale, Fla.**

For further information, check number 22 on page 126.

After 5 years of development
Elenco is proud to present the NEW

TR-200 SSB TRANSCEIVER



REMOTE UNIT **VFO CONTROL UNIT**

The most versatile amateur equipment ever built, a complete bandswitching SSB 200 watt transmitter-receiver.

- For mobile or fixed station use.
- Can be removed from the car in seconds.
- 200 watts P.E.P. input, SSB or CW.
- Wide range pi network output.
- Synchronized or split frequency transmitter-receiver control, with exclusive Elenco Synchro-split VFO circuit (patent pending).
- Sideband selector, selects upper or lower sideband.
- VFO covers 250 Kc. each band, both dials.
- Both VFO dials directly calibrated in frequency for each band.
- Frequency range 10-15-20-40-75 meters (160 on special order).
- Utilizes special 12 element crystal filter for both transmitting and receiving; which provides 80 db unwanted sideband suppression.
- Speech compression, effectively quadruples transmitter power.
- Manual, voice control, or push-to-talk operation.
- 6-12V DC or 115V AC operation.
- High power linear can be used, mobile or fixed; no alterations. Retains all transceiver operational advantages.
- Operates on standard 12V-system, no alterations required in auto primary circuit.

TR-200 transceiver, consisting of remote unit, VFO control unit all mounting hardware and cables	**$895.00**
12 volt DC power supply	**95.00**
115 volt AC power supply	**95.00**
Fixed station speaker	**10.00**

We are now in production on these units. Order direct from factory only; not available through dealers. Factory installation can be arranged. Contact PAUL N. WRIGHT, phone 1264-W.

ELECTRONIC ENGINEERING CO.

WABASH **INDIANA**

For further information, check number 23 on page 126.

Have A Look At . . . THE SELF-SUPPORTING

SPAULDING

Globe Spire TOWER!

Match these Features:

★ Self-supporting up to 32, 40 and 48 ft.; may be extended to 150 ft. with proper guying.

★ Structural design offers exceptional strength; reduces torsional twist; X-brace, bridge-type construction guarantees added strength.

★ Base area over three times that of usual towers (19½" min.) decreases stress and allows greater stability.

★ Combination of U Channel Beaded Type leg material plus wide base mean added strength and durability. Approximately 35% stronger than tubular leg design.

★ Heavy commercial galvanize coating means extra long life. Construction allows easy painting both inside and outside legs at later date.

★ Complete riveted construction with aircraft rivets of extreme high tensile strength far surpasses normal, weld-type construction.

★ Easy to erect; — the higher you go the lighter the sections. Rotator and RotoBrake easily installed. Built-in thrust bearing and rotor mounting plate.

★ Self-supporting and handsomely styled.

★ Anchor base type Spire eliminates use of concrete; allows relocation of tower if desired.

CONCRETE MOUNTED GLOBE SPIRES

Include Bearing Plate, Rotor Plate and three 4 ft. stubs for mounting in concrete.

32 ft.—Cat. No. 69A091	$ 49.95
40 ft.—Cat. No. 69A092	68.75
48 ft.—Cat. No. 69A093	99.50
RotoBrake Mounting Plate (Cat. No. 69A097)	1.65

ANCHOR BASE MOUNTED GLOBE SPIRES

Include Anchor Base, Bearing Plate, and Rotor Plate.

32 ft.—Cat. No. 69A094	$ 71.50
40 ft.—Cat. No. 69A095	91.95
48 ft.—Cat. No. 69A096	129.95
RotoBrake Mounting Plate (Cat. No. 69A097)	1.65

Only 10% Down - Easy Terms

Write for Complete Info and Accessory List to

EXCLUSIVE DISTRIBUTOR

WORLD RADIO LABORATORIES

3415 W. Broadway Council Bluffs, Iowa

PHONE 2-0277

For further information, check number 24 on page 126.

Stolen, as usual, from

AUTOCALL

The bulletin of the
Washington, D. C. Mobile Radio Club

Last month's answers: #1. Zounds, do we have to explain everything to you? This one you've got to work out on your own. #2. There are many answers to this one. A number which might satisfy the equation

$$\frac{x}{y} \text{ equals } n-1$$

Where x is whole heritage, y is the portion of each heir, and n is the number of heirs, will be the answer.

Now, to get you on the hook again here are this month's perplexers. Problem 1) Five hams own five transmitters.

B & W	Bob
Collins	Cal
Gonset	George
Ranger	Red
Viking II	Vic

Note that the initials of the transmitters are same as the men. None owns a transmitter with his initial.

1. The Ranger is owned by a man with the same intial as Vic's transmitter.
2. Bob's transmitter has a built-in VFO.
3. Cal's transmitter starts with an initial farther down the alphabet than Red's.
4. The man with the same intials as Red's transmitter owns the Collins, which Bob sold to its present owner.
5. Who owns which one?

Problem 2.

Add the following:

```
 SEND
 MORE
------
MONEY
```

Each letter stands for a number and no two letters are the same number. The same letter always stands for the same number. That really ought to hold you for an hour. Maybe more. ■

Special DX Issue.

Next month will feature a raft of articles about DX.

If you're not subscribed . . . Happy Hunting!

Third Party Traffic Legal (Phone Patches)		Don't Talk To These Countries (Even on SSB)
Canada	Ecuador	Cambodia F18, XU
Chile	Liberia	Korea HL-HM
Costa Rica	Panama	Indonesia PK, YB-YI
Cuba	Peru	Iran EP-EQ
Nicaragua		Viet Nam F18, XV, 3W

NEW SPORTSMAN SENIOR POWERCON

supplies 110 volts AC from self-contained 12-volt car battery

$79.50

Amateur Net
Less Battery

Now 110 V.A-C...

Packaged Portable Power

For Mobile Rigs...Field Day...Civil Defense...Emergency Standby

The Sportsman Senior Powercon Inverter is a completely self-contained source of 110-volt AC power that may be used with any AC-operated equipment that draws up to 140 watts continuous, or 175 watts for not more than 15 minutes out of one hour. The unit includes a rapid charger, a heavy-duty vibrator inverter, and a compartment that will accommodate a standard 12-volt car battery. Battery can be recharged overnight from any 110-volt AC outlet. Overall size: 14" x 9½" x 9½".

With a fully charged battery, the "Sportsman" will provide the following services without battery recharge:

Intermittent: 4½ hours of operation (transmit 175 watts, 25% duty; receive 60 watts, 75% duty). *Continuous:* 3 hours, 140-watt load; 4 hours, 110-watt load; 7 hours, 60-watt load.

The following bulletins on the "Sportsman" and Standard Powercons are available from your local electronic distributor, or from Cornell-Dubilier Electric Corp., South Plainfield, N. J.: *Sportsman*, EB-3015; *Standard Powercons*, EB-3006; *Accessories*, EB-3013.

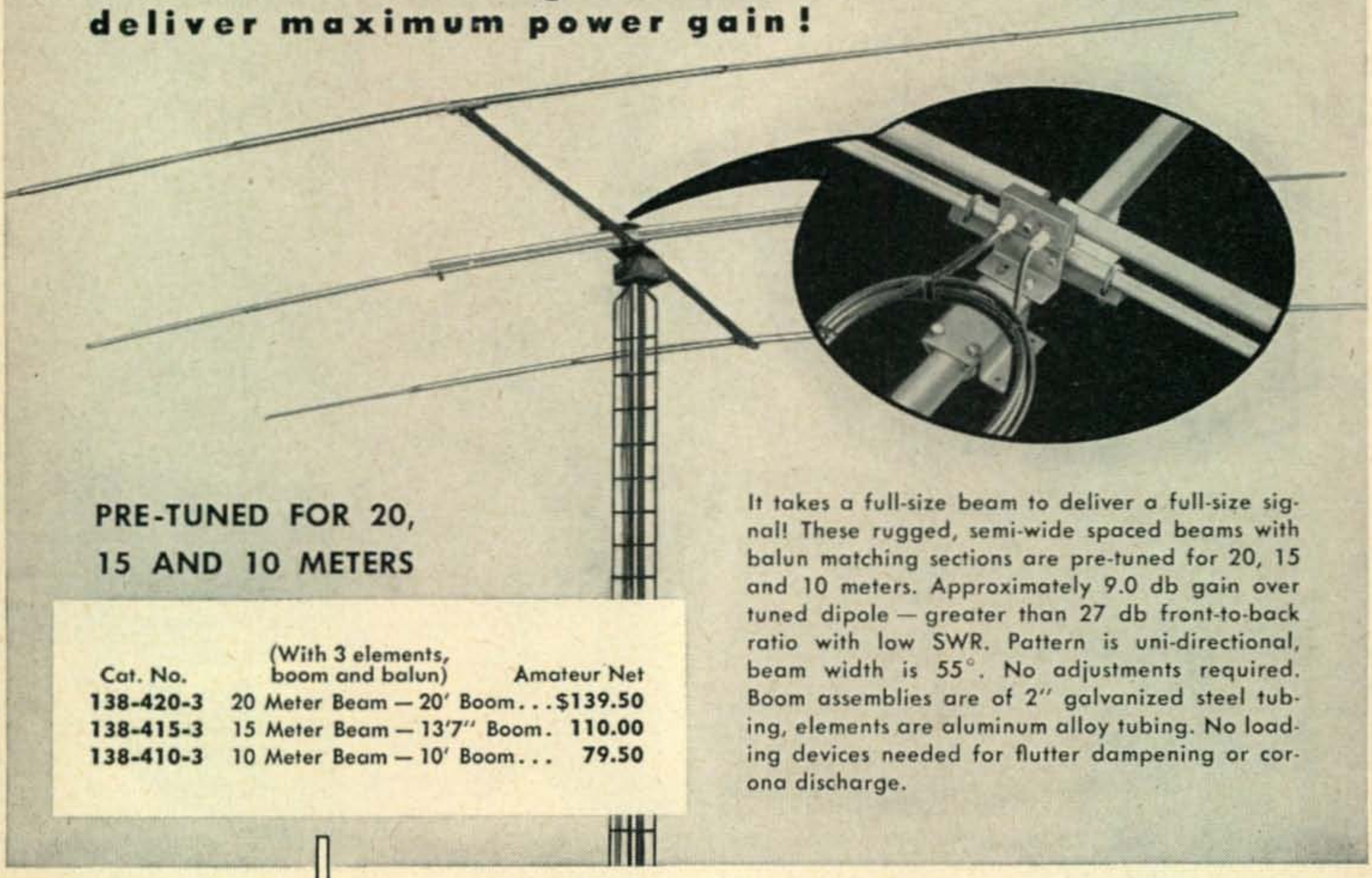
STANDARD POWERCONS: 6VDC - 110VAC, 20-150 WATTS; 12VDC - 110VAC, 20 - 250 WATTS. SELF - REGULATING SINE - WAVE MODELS AVAILABLE

CORNELL-DUBILIER POWERCONS

For further information, check number 25 on page 126.

JOHNSON *full size* BEAMS

deliver maximum power gain!



PRE-TUNED FOR 20, 15 AND 10 METERS

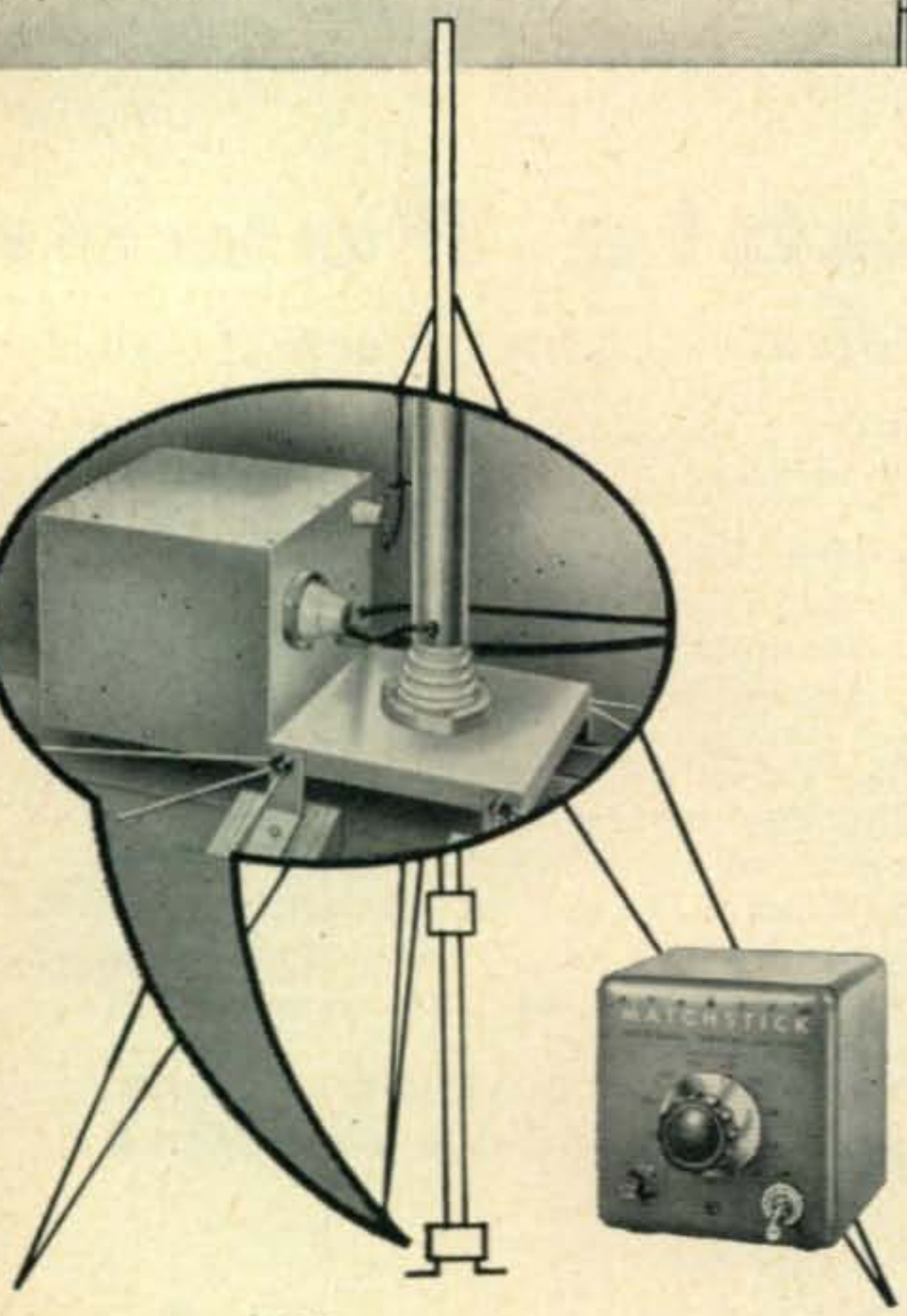
Cat. No.	(With 3 elements, boom and balun)	Amateur Net
138-420-3	20 Meter Beam — 20′ Boom	$139.50
138-415-3	15 Meter Beam — 13′7″ Boom	110.00
138-410-3	10 Meter Beam — 10′ Boom	79.50

It takes a full-size beam to deliver a full-size signal! These rugged, semi-wide spaced beams with balun matching sections are pre-tuned for 20, 15 and 10 meters. Approximately 9.0 db gain over tuned dipole — greater than 27 db front-to-back ratio with low SWR. Pattern is uni-directional, beam width is 55°. No adjustments required. Boom assemblies are of 2″ galvanized steel tubing, elements are aluminum alloy tubing. No loading devices needed for flutter dampening or corona discharge.

"MATCH-STICK"

fully automatic—

bandswitching vertical antenna



Here's the antenna system that solves limited space problems! Completely pre-tuned, this multi-band antenna system may be mounted on a roof stop or in any limited space location — automatically controlled and remotely motor driven from your transmitter location. Low SWR (less than 2 to 1) on all bands 80 through 10 meters — impedance: 52 ohms. Low vertical radiation angle for DX. Antenna tuning network is enclosed in a weatherproof aluminum cabinet located at the base of the antenna . . . effective antenna length and network selected automatically by weatherproof relays mounted directly on the mast. With 35′ mast, base, tuning network, relays, control box and 6 nylon guy ropes.

Cat. No. 137-102 — Pre-tuned.....**$129.50** Amateur Net

See your distributor
Most authorized Johnson distributors offer liberal terms. Often as little as 10% down puts you on the air, and your used equipment (especially if it's Johnson) is always worth top dollar in trade.

E. F. Johnson Company

2931 SECOND AVENUE SOUTHWEST • WASECA, MINNESOTA

For further information, check number 26 on page 126.

Conversion Data Wanted

(Name Withheld)

I'm fed up. Every time I pick up a radio magazine of late I seem to read of some OM lamenting because his wife is not an amateur. He would have you believe that his burning problem, and that of many other fellows as well, is how to turn his XYL into a ham. My problem is just the opposite. I wish someone would concentrate on how to turn a particular ham into an XYL.

I am a young and not too repulsive YL. No one would need to cajole, flatter, or bully me into learning the code, for I already know it and have a general class ticket to prove that I do. I require no selling on amateur radio as a hobby, for I realize it is the tops. I understand perfectly that a DX contest is far more important than an evening out and that, while a wedding anniversary might slip from a man's mind, he could never forget the Field Day date. Wouldn't you think that eager single hams would have me dated up for weeks in advance? Well, they don't.

No one seems to care that I'm a YL with a substantial dowry consisting of a new home rig and a mobile station. The crux of the whole matter is this: My fellow hams insist on seeing me as a ham—all the time. They just can't seem to realize that I am also a Young Lady. Let me give you a typical example of what happens when I get on the air:

The other day I snagged a station operating from our state university about fifty miles from my QTH. I felt sure the operator was young and eligible; so I made sure he knew I was a YL.

"OK, Bill; solid on that transmission," I returned. "You are certainly putting in a nice signal this evening. By the way, the handle here is Julie; and I'm a YL, a single, unmarried, unattached YL. Hi! Hi!"

Admittedly that is not too subtle, but I have already learned that being subtle will get you nowhere when dealing with the genus *homo hammus sapiens*. I wanted to be sure and give Bill a good strong hint that I might be available for a college dance or a radio club picnic some time; but here is how he came back:

"I think you said something about being a YL, Julie; but the thing I really missed and want you to repeat is how much power you're running there. Tell me that again on the next turn and also let me know what kind of antenna you're using."

The only time my YL status even remotely entered the conversation after that was when Bill passed along the dubious compliment that my voice "cuts through QRM better than an OM's voice."

A gal who is not a ham is encouraged to get all spruced up by the expectation of the compliment her date will pay the new dress or the special hair-do, but it's different for a YL. Why, I can spend three hours bathing, dressing, brushing, and primping; yet the first words I hear from my ham escort will likely be, "Well, how much DX have you worked since our last eyeball QSO?"

I'll never forget preparing for a date about which I was particularly enthusiastic. Having recently been impressed by an article on the importance of having soft, white hands, I spent a good two hours giving myself a manicure to out-do all manicures. My nails were trimmed and polished to perfection. Those hands, if I do say so myself, could have served for a lotion advertisement.

Joe arrived; and while we were waiting for the other half of our double-date to show up, we sat and chatted—about ham radio, of course. But as we talked I casually toyed with a little silver paper knife, being very careful to see that my fingers were curled gracefully and that my hands appeared to the best possible advantage. Sure enough, my innocent little strategem worked. I noticed Joe's eyes straying to my hands more and more often; and his remarks became halting and distracted, revealing that his mind was not on what he was saying. Finally he blurted out, "Gee, Julie, you sure do have a sweet-sounding fist!"

A fist he called it! For this I had manicured!

But that's not all; let me tell you more. You might think a hamfest would be a YL's Happy Hunting Ground. I cherished this idea, too, for several months last winter while I was anticipating the season's first hamfest in our

area. I imagined how it would be to meet all the fellows who had greeted me over the air with cute comments and daring flattery.

It didn't turn out just the way I hoped. In the first place, no one seemed as eager to meet me as I had expected. Take a ham out from behind this microphone, and a strange shyness seems to come over him. The wolfish character who insists on signing off the first QSO with '88' is too bashful to come up and introduce himself in person. I just know I saw fellows peering at my call tag from behind trees as I passed by.

But even the ones you manage to meet do not turn out exactly as planned. Take Ken, the tall, broad-shouldered, handsome fellow who really was a dreamboat. After we had introduced ourselves in true hamfest style, I just knew we were going to spend the whole day together sauntering about the hamfest, getting to know each other.

We spent the day together all right, and we did some sauntering, if that is what you care to call marching up and down the endless rows of sun-baked cars in the parking lot inspecting mobile installations. What fun I had peering into hot automobiles, brushing my dress on dirty fenders, and getting the sunburn of the season!

And while I was scuffing up my high-heel slippers on the loose rock of the parking area, a fluffy-headed little blonde, who would not know a 6146 from a 4-250A, sat in the cool shade and had the fellows falling all over themselves bringing her cold drinks, ice cream, and what have you. When she asked a stupid question about radio and looked prettily bewildered at the eager answers, the boys all chuckled about how cute she was. But just let me make the smallest technical boo-boo, and I am subjected to ridicule and looks of scorn from the OM contingent. I am expected to know just as much about the theory behind scatter propagation as I am about baking a cherry pie.

These small disappointments can be swallowed in time, but some wounds never heal. Take my date with Dan, for instance:

I had met Dan at a hamfest and talked with him many times on 75 meters. He was nice looking and well mannered, and when he mentioned that he would like to drive over and see me some evening, I was elated.

When the appointed evening arrived, I had gone all out in the way of preparation. My ruffled pink summer dress was without a wrinkle, and I was powdered and perfumed until I felt the very picture of dainty, appealing, irresistible femininity.

Dan arrived just as the sun had disappeared over the hill and bright stars were beginning to jewel the sky. The summer breeze that stirred the leaves was warm and gentle and fragrant.

"The ride over was really nice," Dan commented. "Why don't we go for a little spin in the country?"

"That sounds wonderful to me," I replied, congratulating myself on having at last found a ham who could think of something besides radio.

I slid into the front seat carefully in order to avoid snagging my hose on the mobile rig mounted beneath the dash. We drove slowly, listening to the chorus of nocturnal birds and insects accompanied by the bump-bump-bump of the whip antenna striking low-hanging limbs along the lonely country road.

As we approached the crest of a hill, Dan slowed down and turned the car into a dark, narrow lane. The lights of the town peeped up at us through a grove of trees, and the silence was broken only by the tinkle of a cowbell from the nearby pasture.

Dan turned off the engine and deliberately removed the key from the ignition. Slowly he turned to where I sat in the darkness beside him, anxiously wondering what he was going to say—and do.

"You know what?" he said. "This looks like a dandy place to see how well we can get out on forty meters. It'll just take me a minute or so to unlock the trunk and switch the transmitter to forty. You be warming up the converter."

There you are. Any other girl would have returned home with an earful of sweet nothings; but Julie, the YL, worked Sheboygan, Wisconsin, on forty meter mobile; and she got an earful of heterodynes and summer static doing it.

I hope I don't sound too bitter about all this. Such is not my intention, but there is no denying I have been worrying about it. It seems to me that if married hams really are so eager to have their wives become amateurs, the unmarried ones would jump at the chance to acquire a wife who is a made-to-order ham and needs no tedious, long-drawn-out conversion. The fact they are such reluctant jumpers makes me wonder if those married fellows really *do* want their wives to become hams. Maybe they just want the XYLs to think so.

The really exasperating part of the whole business is that even though a non-ham date is flatteringly aware of the difference between me and a piece of electronic gear, we simply do not speak the same language. When I go out with one of them, I feel as uncomfortable as a circus performer probably does when she dates someone "off the lot."

On top of that I am stubborn, and I insist on being consistent even though I am a woman. Since I contend that single OMs should leap at the opportunity to acquire an XYL complete with license, I can't very logically contract to convert a mere husband into an OM. can I? Or can I? ■

a cheap and dirty (and new) way to get . . .

Bill Seches, K6CHY
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S.W.R. 1-1 (Almost)

There are a number of good ways to match the driven element of your beam to its co-ax. Some methods are easier to adjust than others, some have advantages, etc. I have tried several since catching the "10 meter bug" about eight months ago.

When I built my first beam, I used the conventional gamma match . . . a small condenser in a plastic box. This, together with a wire tapped out about 16 inches from the center of the driven element worked very well the first day. Then I noticed that my SWR was different in the early morning than later in the day . . . moisture condensing inside the box. Then, *the rains came* . . . and *WOW* . . . water seeped into the box . . . my SWR went sky-high and my co-ax blew out several times.

Down came the beam, and the gamma match. I inspected the little condenser and found it to be quite corroded, even though the beam had only been in the weather for a month or so. The answer had to be something that would be easier to waterproof . . . I thought I had it . . . I replaced the gamma match with a "T" match, with a half wave balun. I was never able to get the SWR down below about 3 to 1, when the beam was shoved up in the air, although it was a little better than when tuned on the ground. I found with this match, that the frequency response was rather narrow . . . but it did work . . . and it was not affected by the weather . . . a step in the right direction.

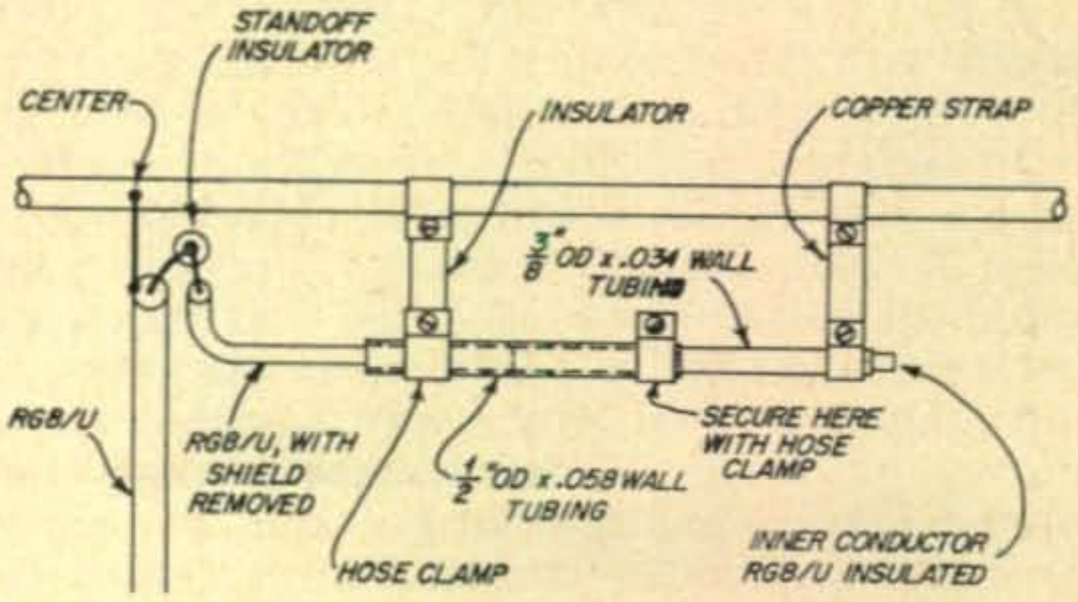
I was disappointed in the SWR of the "T" match . . . the old Gamma match was much better (when dry!) . . . if I could only make it moisture-proof. Well, gang, the following is the answer to that problem!

A Gamma match consists of a gamma rod and a condenser. A hunk of co-ax has capacity . . . if you tape up the end carefully you have a waterproof condenser between the outer shield and the inner conductor. Now we are getting somewhere!! I set up a half-wave element across a table in the rumpus room, used a piece of co-ax about a foot long in lieu of a variable condenser in the gamma match . . . and by golly it worked . . . SWR less than about 4. I cut off some of the outer shield and the SWR went down. Conclusion: A hunk of co-ax will act as a nice waterproof condenser, but is awkward to adjust. By the way, in this experiment and in subsequent experiments, there is no connection between inner conductor of the co-ax and the driven element, other than the capacity between the inner conductor and the shield of the co-ax, which is our gamma matching condenser. Well, fellows, the solution is simple . . . make the capacity of the co-ax adjustable. The drawing shows how I did it.

On my beam I use a twin-boom, which make the length of all my elements about four inches longer than is shown on the tables. I assume it will also affect the length of the gamma "rod" . . . On my beam the gamma rod is 27″ long . . . it may be shorter on yours. Construction of the gamma match is simple. Remove the outer cover and shield from 27 inches of RG-8U. Slip the inner conductor and insulation into a 12 inch piece of thin wall (about .031 or less) ⅜ inch tubing, first taping the end of the wire and then again taping it after inserting it in the tubing. Over the tube containing the wire slip a 12″ length of ½″ .058 Aluminum dural tubing, previously slotted on one end. Over the slotted end put a hose clamp. The gamma match is strapped to the driven element and ⅜″ tubing connected about 27″ out from the center, (on my beam—may differ on yours). Adjust by sliding the half inch tubing over the ⅜ inch tubing until lowest SWR is found. Then tighten up the hose clamp and carefully tape up the entire assembly with electrical scotch tape.

Mine worked like a charm right off the bat . . . hope yours does . . . no reason why the same deal to larger dimensions would not work equally well on 20 and 15. Also, two of these gadgets would make a "T" match that would be easy to tune up . . . I may try that experiment at a later date.

See you on 10! ■



Mobile antennas for the Home

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3434—74th Ave., SE.,
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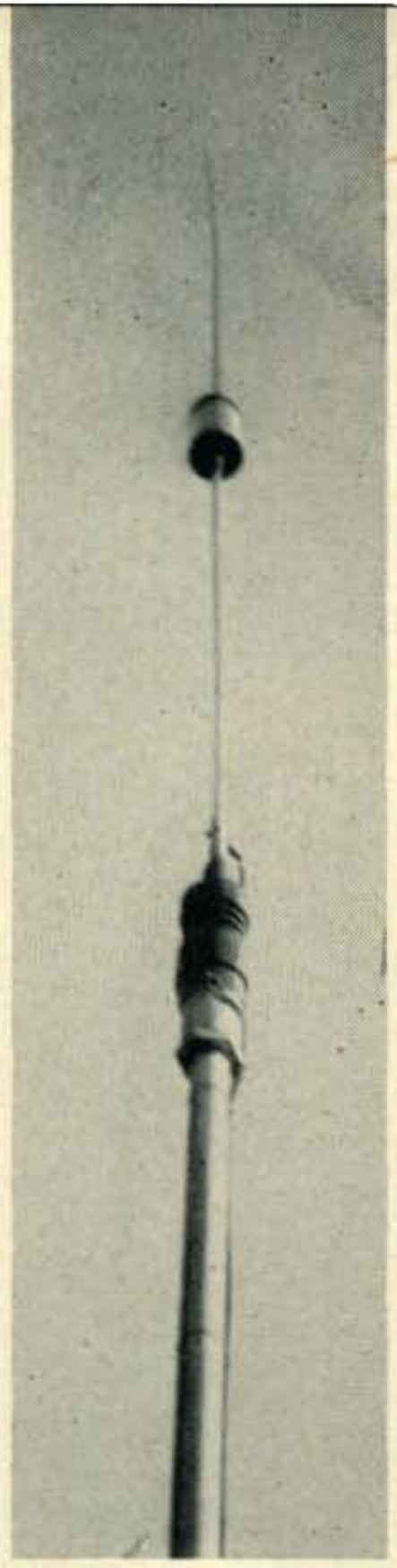


For many years various radio publications have offered a score or more 'solutions' for the ham who wants to work 3.5/4.0 mc band but is restricted for space in which to hang a half-wave 'sky-wire'. Various types of 'bent' antennas, many versions of quarter-wave verticals with and without ground radials, ground planes of various types have all been put forth along with suggested use of quarter-wave horizontal wires with feeders tied together and working against ground as a 'Marconi' type.

Until recently I had no occasion to give more than a passing thought to these suggested schemes as I had ample space for a horizontal half-wave wire. As 75% of my ham activity is devoted to the 80 meter c-w traffic nets with only an occasional excursion to the higher frequencies, I have experimented with every popular form of HF antenna as it has appeared, over many more years than I care to count. Invariably I came back to the good old standby . . . the off-center fed half-wave horizontal single wire, using a single feed-line of random length . . . more recently termed the 'Windom'. My results have been excellent . . . it was not only a most effective 80 meter radiator but worked very well on all harmonic frequencies to and including ten . . . truly an 'all-wave' antenna.

I had no problem until lately when I was faced with the necessity for re-locating a forty foot mast and it was impossible to so erect it to obtain a 135 foot span without tangling with a heavily wooded area which could not be cleared. None of the 'solutions' previously offered appealed to me as I had had much experience with relatively ineffective antennas during many years of practically constant travel throughout eleven Western states during which time I carried a fifty watt portable c-w rig to maintain reasonably constant contact with the c-w traffic nets. Living in Motels, as I invariably do, the antenna problem, particularly with the advent of TV in most Motel units(!) was quite something. Sometimes I could manage a random piece of hook-up wire tossed over the Motel roof after dark (owner less likely to notice!). At other times I used a seven foot automobile whip inside the room and with no tuning other than the pi network in the transmitter. It loaded, but results using either method were mediocre at best and my usual signal reports were often RST 3-2-9 to 3-4-9 . . . not good!

It occurred to me that with the many reports of very successful operation with mobile equipment using *tuned* whips which were becoming increasingly popular this might be the answer . . . there should be no sound reason why the whip had to be mobile!

Searching all available advertising produced a number of pretty decent looking tuned whips. Pursuing my study further made it appear that center loading had some advantages over either top or bottom loading methods. This narrowed the choice between several reputable makes. I finally chose one of the *Davis Electronics* five foot fibre-glass whips together with their 80 meter, '500' series, Hi-Q coil and their 36" base section. To this I added a complete set of their QWIK-ON connectors for convenience in quick assembly and disassembly without tools, as I moved on frequently.

Results were remarkable! The little Viking Adventurer, which I habitually carry, loaded perfectly and really 'poured it to' the antenna . . . I could draw a half inch arc from the top of the load coil! I fed the antenna with a random length of RG/58U direct from the transmitter with no external tuning arrangements. The comments I received over the air were most gratifying . . . signal reports were

never less than RST 4-6-9 and more often than not were RST 5-7/8-9 with an occasional RST 5-9-9! These were contacts with the same net stations previously contacted and from the same general geographical areas. AND . . . in only *one* instance did I have the whip outdoors! Invariably it was leaning against the inside wall of the room . . . a bit too long to stand completely upright!

My experience on the road with this arrangement began to affect my thinking for the new home antenna, now that I was one of the 'restricted space' boys. Sure, I knew that I'd get better results with the portable with a more effective and resonant antenna, but not to the extent I did. If the thing performed so remarkably well in the field, why not stick it up in the air at home and give it a try? I was fortunate in having a couple of summer months around the home QTH and I took advantage of this to mount the whip on a flat roof portion of the house with the base only fifteen feet above ground level. I tried this on the home rig . . . a Viking Ranger . . . with a random length (about 35 feet) of RG/58U coax, direct from the transmitter output terminal and again without any external coupling or tuning device. Once more I experienced the pleasure of getting *better* signal reports than with the Windom! A few stations reported little difference between the two but by far the majority gave me increased signal strength of from 1 to 2 S-units! For a period of about two months I tried one against the other under all conditions; day and night, good and bad band conditions, fading, static etc., and with the same set of comparison stations. The whip won, hands down! Not only in the 80 meter band, but contrary to accepted practice it doubled well into the 40 meter band with the 80 meter coil and gave some measure of success on 20 altho somewhat less than with the 'Windom'.

I was sold completely and proceeded to make a permanent installation of the center tuned whip. As my old forty foot mast was approaching the first stages of decay, I decided to abandon it and to get the whip really up where it had a chance, I chose a 'crank-up' tower as being most suitable for my purpose. As I am gone from home for long periods it appeared desirable to have such a support so that it could be left cranked down during my absences to lower the hazard of wind and storm damage. I chose a *Tele-Vue* No. 40 tower which telescopes to about twenty feet and extends to forty by means of a crank mechanism at the base. My choice was based on light weight (80 pounds), hinged base permitting easily tilting the entire tower to the ground for occasional maintenance, and the hollow tubular legs permitted running the coax feed-line up through one of the upper legs thus eliminating necessity for strapping the coax to the tower legs to prevent wind-slap.

I have little data on the effect that raising the whip the additional twenty-five feet may have produced. Certainly signal reports did not suffer but they were so good with the whip at the experimental fifteen foot level that the higher elevation could hardly produce better reports from the same comparison stations! However, from the distances worked on 80, with consistent good signal reports it has been increasingly evident that the whip at forty feet actually surpasses results previously secured with *any* type of half-wave horizontal wire!

For my occasional excursions to forty I procured another Davis whip, base section and 40 meter '500' series Hi-Q coil and mounted this on the roof peak 22 feet above ground. Performance here, although in use but a relatively short period, has been every bit as satisfactory as with the 80 meter arrangement. I use a co-ax relay in the shack to shift the RG/8U feed from the transmitter to either the 40 or 80 co-ax line to the appropriate antenna. (I use the more rugged RG/8U at the home QTH and the lighter RG/58U for convenience on the road . . . the impedances are approximately the same). The Windom has been lowered and coiled away to join other relics of the past. Before too long I hope to have a 20 meter coil, whip and base section and then "W7OE Radio Central" will be complete!

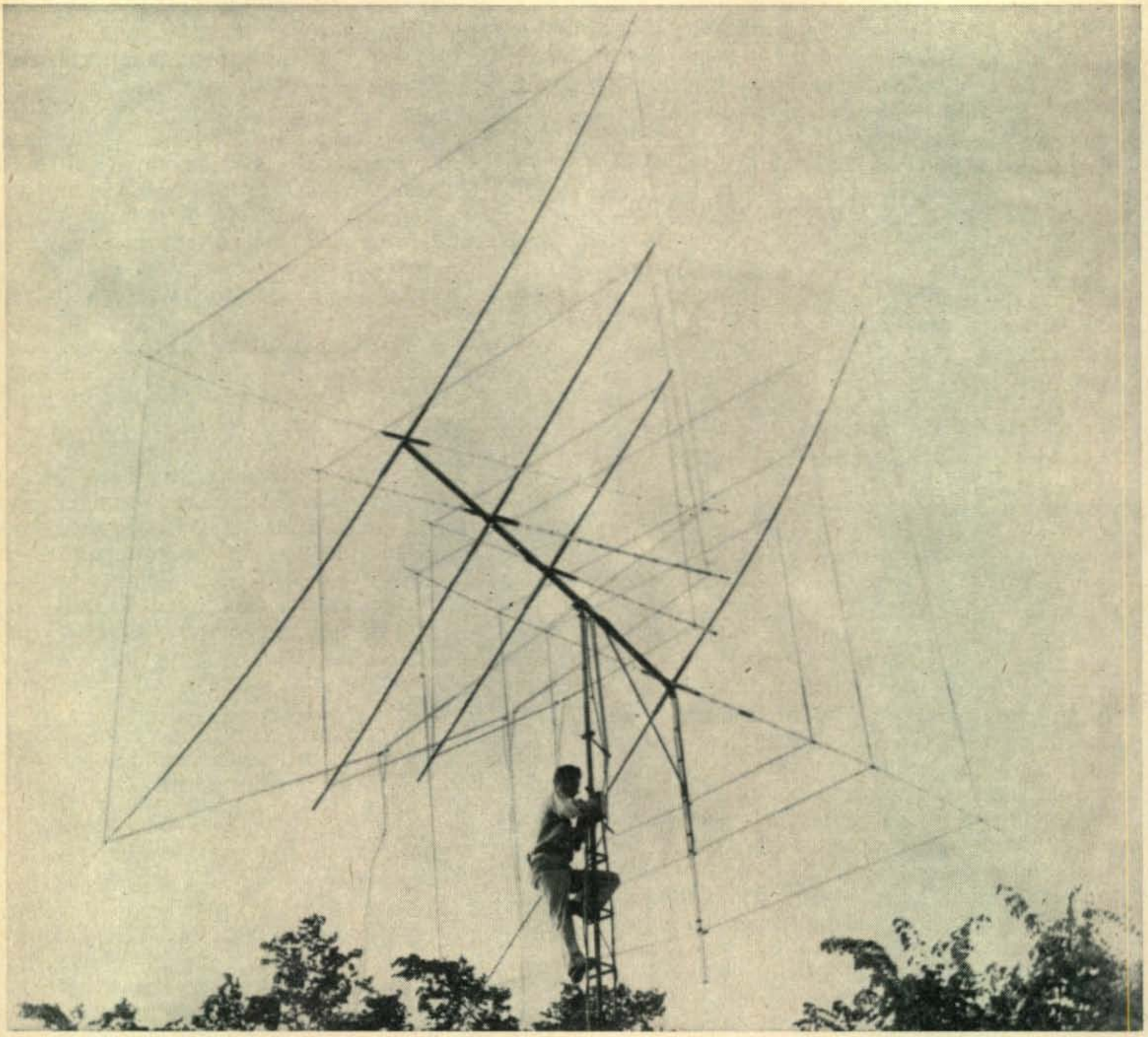
Advantages

What a boon for the apartment dweller! Imagine just mounting a center-tuned whip on a flat roof six or eight stories above the street and forgetting the worry of 'where to string a wire'! For general portable operation and for Field Day participation, what an answer! State and County Fair set-ups . . . "Hobby Show" demonstration booths . . . the answer to any number of similar applications. For emergency use, set up the whip in seconds, and 'you're in'.

It is presumed that any *good* make of center loaded mobile whip will produce about equal results. The *Hi Q* coil and the *Kwik-On* assembly features of the Davis whip, appealed most to me. Likewise, any suitable support . . . tree, mast, roof-peak . . . what have you, can hold the whip at a fair height. I chose the tower for the reasons outlined plus the fact that it needs no guying as the lower section is supported against the house.

Give it a thought, you fellows with restricted space problems. Give it *two* thoughts, you who are using and probably swearing by a pet half-wave horizontal . . . you too might be missing the boat! ■

The omni-directional characteristics and lower angle of radiation of this antenna as opposed to the bi-directional hi-radiation angle associated with horizontals would explain the better coverage —Ed.



a Three Band Quad

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For the amateur who likes to work the 10, 15 and 20 meter bands it is a distinct advantage to be able to switch from one band to another with a minimum of effort and time. With the ever increasing number of active hams on these three bands it becomes almost a necessity to have an efficient rotatable antenna array.

For quite a number of years I had been envious of some of my more fortunate fellow hams who could afford to have everything from a stacked Yagi beam array to a Rhombic. Having neither much room on my ordinary city lot nor the finances to have an antenna farm, I decided to quit day-dreaming and go to work on something which would be practical for me.

Several types of antennas were considered and rejected, not because they were not good, but simply bcause the necessary room was not available. Most of the available space in my back yard was taken up by two large elm trees. For a moment, a chopping axe seemed to be the

only solution, but the XYL soon dampened my enthusiasm on that bit of wishful thinking. It was then that I turned to the cubical quad, which is being revived in many parts of the country. This type of antenna is well suited for multi-band construction. Apparently other amateurs seem to share this view also, judging from the interest manifested in dual and tri-band quads. Although the idea for a three band quad was first conceived by the author in the fall of '54, it was not until August, 1955 that the antenna was completed and put into service. Since it offers a number of features that may appeal to the antenna minded ham, it was decided to pass along the details to CQ readers.

In looking over a 20 meter quad, my first impression was of its bulk. Then the thought occurred to me, why not use the available space? By adding additional driven elements and reflectors I would have three cubical quads stacked on one boom, instead of one. The only thing that worried me was the possibility of undesirable reaction due to the close proximity of the elements. It was decided to build and check each element separately and together to see what the results would be. For instance, a 20 meter quad was constructed first and put into service; then the 15 meter elements were installed and checked; after that came the 10 meter section. No difference in performance was noted in any of the quads used. With all the elements securely in place, the antenna worked beautifully.

Fundamentally, the three band quad consists of three radiating elements backed up by three matching parasitic reflectors of the same configuration, as shown in *fig. 1*. Actually these elements are folded dipoles fashioned into square loops, with each side representing one quarter wavelength, making a total of one wavelength around the square loop. The spacing between the driven elements and reflectors is approximately 0.175 wavelength on 14 mc, 0.185 wavelength on 21 mc, and 0.175 wavelength on 29 mc. A slight additional gain on 10 and 15 meters may be obtained by moving the 10 meter reflector to 86″ for 0.20 wavelength, and by moving the 15 meter reflector to 108″ for 0.20 wavelength.

On the air tests showed that the three band quad had an excellent forward gain with a sharp drop-off from front to side. This can be varied by adjusting the shorting bar on the tuning stubs of the reflectors. The position of the shorting bar is adjusted experimentally either for maximum forward gain, maximum front to back ratio, or a compromise between the two as desired. An Antennascope or field strength meter is recommended as an aid in getting the desired results while adjusting the three quads. The theoretical gain, based upon conventional methods of gain calculation for directional arrays, is approximately 8 db over a matched, reasonant half-wave dipole. However, many amateurs have reported measured gains on the order of 10 db, which compares favorably with a 3 or 4 element Yagi type beam.

Fig. 1

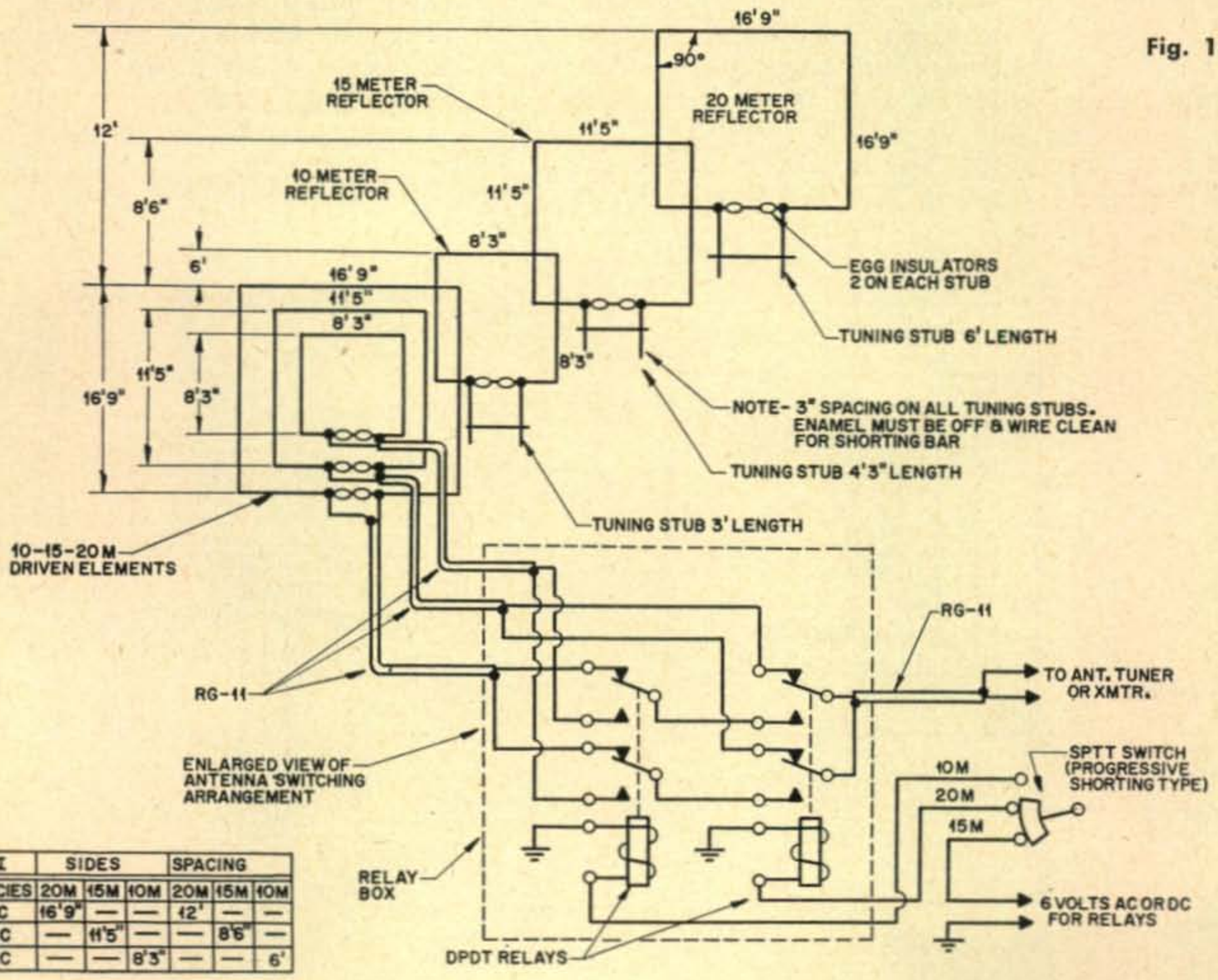


TABLE I	SIDES			SPACING		
FREQUENCIES	20M	15M	10M	20M	15M	10M
14,150 KC	16'9"	—	—	12'	—	—
21,200 KC	—	11'5"	—	—	8'6"	—
29,000 KC	—	—	8'3"	—	—	6'

In addition to its gain, the three band quad has other features worthy of consideration. RG-11/U 75 ohm coax is used on the driven elements in a simple direct hook-up. No line balance converters or phase inverting sections are needed. The standing wave ratio is low, which is desirable for reducing TVI. The antenna also has a low angle of radiation—desirable for DX. Because of its simple construction it is easy to build and adjust. It is a full size beam with no loading coils to absorb power, yet the boom is only 12 feet long as compared to a 20-foot Yagi boom, hence it occupies less space in rotating. Best of all, the antenna is bandswitching for 10, 15 and 20 meters and costs only about $20.00 to build, depending on locality and the amount of material already on hand. Mine cost $5.60, how can you beat that?

Construction

All of the material used in the construction of the three band quad is readily obtainable in most localities. Once the material has been accumulated, actual work may begin.

The boom is a 12-foot section of 1½" x 1½" square aluminum tubing with a ⅜" 1½" x 48" aluminum reinforcing bar, *fig 2*.

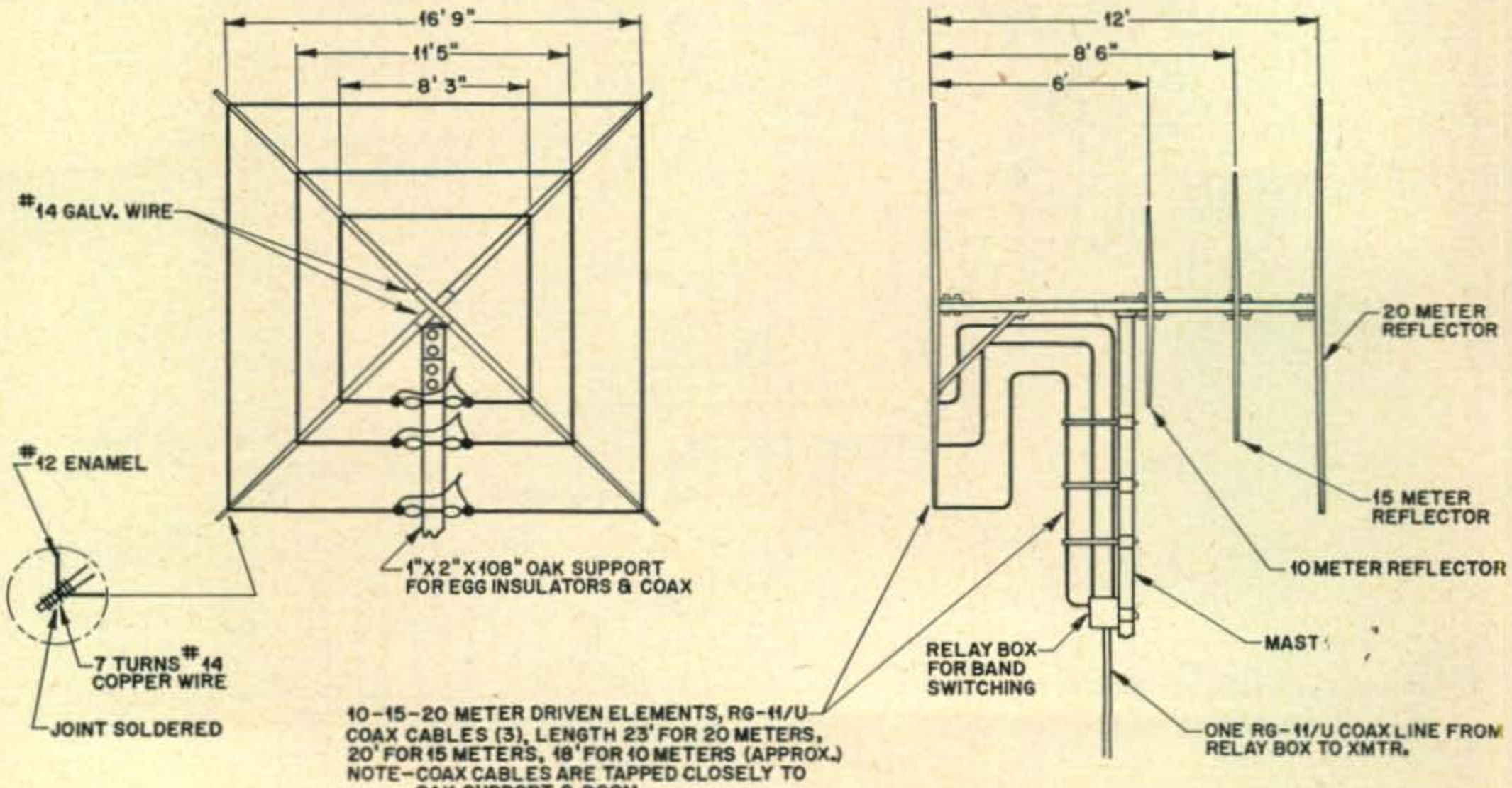
The boom may be made of round aluminum or steel, or even wood, as long as it is strong enough to support the weight of the elements. Total weight of the antenna is about 45 lbs. The support brackets are made from 1" x 1" x ⅛" angle iron. A hacksaw will be needed to cut 4 pieces of angle 24" long, and 8 pieces 12" long. In addition, three plate steel mounting pads 3/16" x 1½" x 5" and one angle mounting pad 3/16" x 1½" x 5" x 5" will be required. The angle iron pieces along with the mounting pads are then welded together as shown also in *fig 2*. Four complete support brackets will be needed to hold the sixteen bamboo poles used in the construction of the three band quad. In selecting the bamboo fishing poles it is suggested that those imported from Japan be used since they seem to be superior to the American variety. They should be straight, free from splits, and about 18 to 20 feet long. Since the poles are longer than necessary, they may be cut to their approximate length as follows: eight 13 feet long, four 9 feet long, and four 7 feet long. Be sure to cut the surplus off of the small end of the poles. Later, after the arms are mounted in the bracket supports and the antenna wire is fastened in place, an additional amount may be cut off the end of the poles to make the antenna more compact and neater. Before mounting the arms, however, the butt end of each bamboo pole should be wrapped with a layer of friction tape for protection against the wire used in securing the arms to the brackets. Each bamboo pole is then given two coats of spar varnish to weather-proof it.

In laying out the radiator and reflector loops, *fig 1*, the No. 12 enameled wire was measured and marked by bending the wire to a 90 degree angle at quarterwave intervals. The enamel was also scraped off at each 90 degree bend to permit soldering to wire anchors on the poles.

With the bracket supports laying flat on the ground, drive a steel peg on each side of the bamboo poles; this will help to hold the arms rigid when pulling the wire taut. Fasten the wire loosely at first as it may be necessary to slide the joints up or down the poles until all four sides of the radiator or reflector are at equal distances from the center.

Once the antenna wire is located on the support arms, it can be fastened permanently

Fig 3.



where it touches by drilling a small hole in the bamboo poles on each side of the wire. The holes are used to anchor about seven turns of No. 14 tinned copper wire (bare) as a means of holding the antenna in place. The next step is to install two "egg" insulators at the bottom of each element in the center to the loose ends of the antenna wire. These are then tied together 3″ apart. When the driven elements and the reflectors are completed, they are mounted on the boom with 5/16″ x 2¼″ machine bolts. By all means use lock washers under the nuts.

The whole assembly can then be mounted on an 1¼″ pipe mast by means of a pipe flange and bracket. Notice in the assembly drawing *fig. 3*, that the antenna is mounted slightly off center to counter-balance the weight, and also to provide clearance for the 10 meter reflector. Each driven element is equipped with a short length of RG-11/U coax cable which goes to the relay assembly mounted in a metal box on the mast. The size of the relay box is 4″ wide, by 3″ deep, by 6″ long. A 1½″ x 3½″ slot is cut in the top end of the box, and a 1½″ x 1½″ slot is cut in the bottom end. These are cut for the purpose of insulating the chassis receptacles from the metal box. Three type SO-239 coax chassis fittings are mounted on a polystyrene strip to accommodate the three feed lines from the driven elements. This insulated strip is then secured to the top of the box by means of 6-32 x ¾″ machine screws. One SO-239 coax chassis fitting is similarly arranged and secured to the bottom of the relay box to take care of the coax line from the transmitter. Only one RG-11/U transmission line is needed from the relay box to the transmitter as a result of the switching arrangement.

Antenna switching is accomplished through the use of two low voltage DPDT relays and one SPTT progressive shorting switch. This is a very simple arrangement and permits the operator to choose the antenna desired by rotating the progressive shorting switch to any one of three positions, see *fig 1*.

Performance

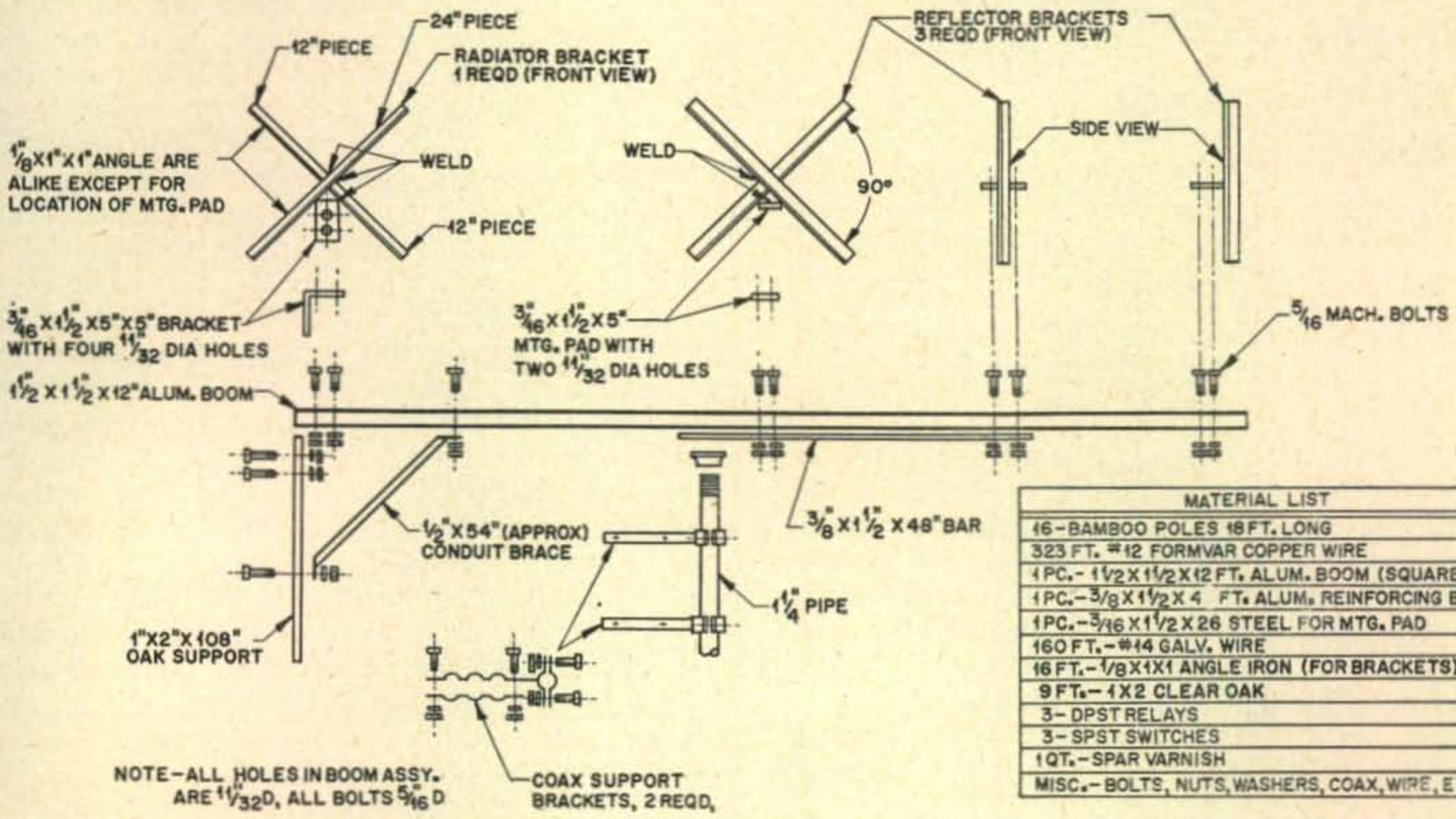
In spite of the antennas' frail appearance it has turned out to be rather rugged. As a matter of fact I accidentally dropped it when I was about 20 feet up on the tower. To my surprise, it bounced around on the ground like a "giant" spider with no damage resulting.

After eighteen months of usage in all kinds of weather, the three band quad continues to give a good account of itself. Results have been extremely gratifying. Signal reports on all three bands have been averaging well above an S9. On 15 meters, the band I prefer, WAC was worked easily. Best signal reports on DX from oversea contacts was 40 over S9 on both 10 and 15 meters, and 20 over on twenty meters. Contacts were made on phone with a power input of 140 watts.

While there is nothing spectacular in these results, they do prove that the three band quad merits more than just a passing glance. For the amateur who is saddled with the problem of space and finances, why not try a three band quad. From the many inquiries received and the interest manifested, it would seem to be a worth-while project, besides offering possibilities to the experimenter.

In conclusion, I would like to express my thanks to the Southwest Missouri Amateur Radio Club for their interest and encouragement in the design of this beam. ■

Fig 2. The parts list should read 2 DPDT relays and 1 SPST switch, not 3 and 3 as shown.



MATERIAL LIST
16 - BAMBOO POLES 18 FT. LONG
323 FT. #12 FORMVAR COPPER WIRE
1 PC. - 1 1/2 X 1 1/2 X 12 FT. ALUM. BOOM (SQUARE)
1 PC. - 3/8 X 1 1/2 X 4 FT. ALUM. REINFORCING BAR
1 PC. - 3/16 X 1 1/2 X 26 STEEL FOR MTG. PAD
160 FT. - #14 GALV. WIRE
16 FT. - 1/8 X 1 X 1 ANGLE IRON (FOR BRACKETS)
9 FT. - 1 X 2 CLEAR OAK
3 - DPST RELAYS
3 - SPST SWITCHES
1 QT. - SPAR VARNISH
MISC. - BOLTS, NUTS, WASHERS, COAX, WIRE, ETC.

Matching With the "L"

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The matching of load impedance to signal source is essential to achieve the maximum transfer of energy. Only rarely do we find an instance in which the output impedance of an rf generator is the same as the load which we wish to feed.

One of the simplest and most effective types of impedance transformers is the "L" network. The "L" is a four terminal network in which one arm is capacitative and the other inductive (*fig 1*). The values of the reactances are functions of frequency, phase shift, and impedance transformation.

If we stick to the one application of impedance matching, we can disregard the phase shift property of the network, bearing in mind that it does occur. When the magnitudes of two impedances are known, values for the reactance arms can be calculated. The "Radio Engineers Handbook" (Terman) contains valuable information and design charts for L-networks, including phase shift.

Most of us tackling impedance matching problems know only too little of the exact values of the impedances which we wish to match. In the case of a transmission line we can make a reasonably valid assumption as to the characteristics of the line be-

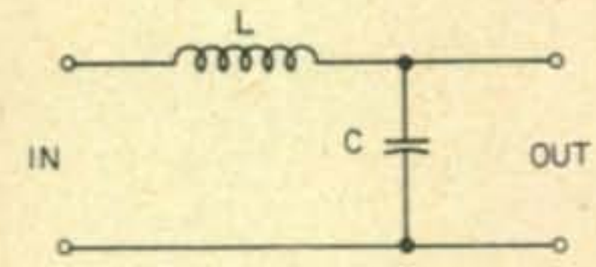


Fig 1

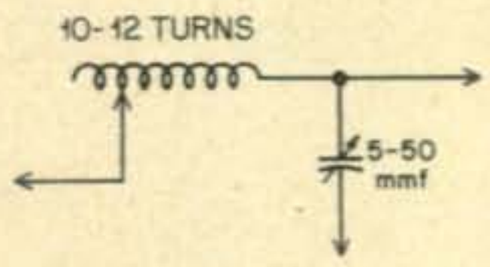


Fig 2

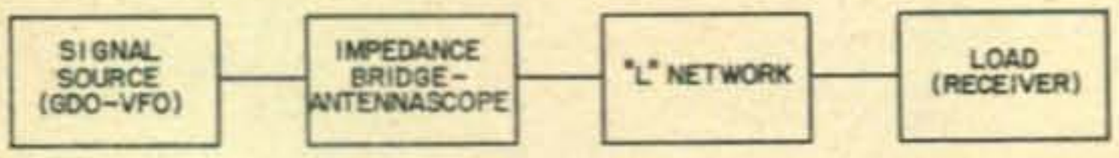


Fig 3

cause the manufacturer tells us what it is. Fortunately the most obvious practical value of the L-network is in matching transmitter to line, line to antenna or line to receiver.

An expedient method of doing this in empirical fashion is to use approximate variable reactance values and, by means of a stable signal source and impedance measuring device, vary them until the desired result is obtained. Such a test device can be made from 4 alligator clips, a small inductance, and a small variable capacitor (*fig 2*).

Operation is simple. For example, if one wishes to match an antenna feeder to the receiver, the antenna being fed with 75 ohm coaxial cable, the set up is shown in *fig 3*.

With the hook-up as in fig 3, the signal source is set at the frequency desired, the bridge at 75 ohms and the L-network is adjusted (by rotating the condenser and changing the taps on the inductance) until the null indicating a match is achieved. For the permanent installation the exact values of the reactances are duplicated in fixed form and soldered together.

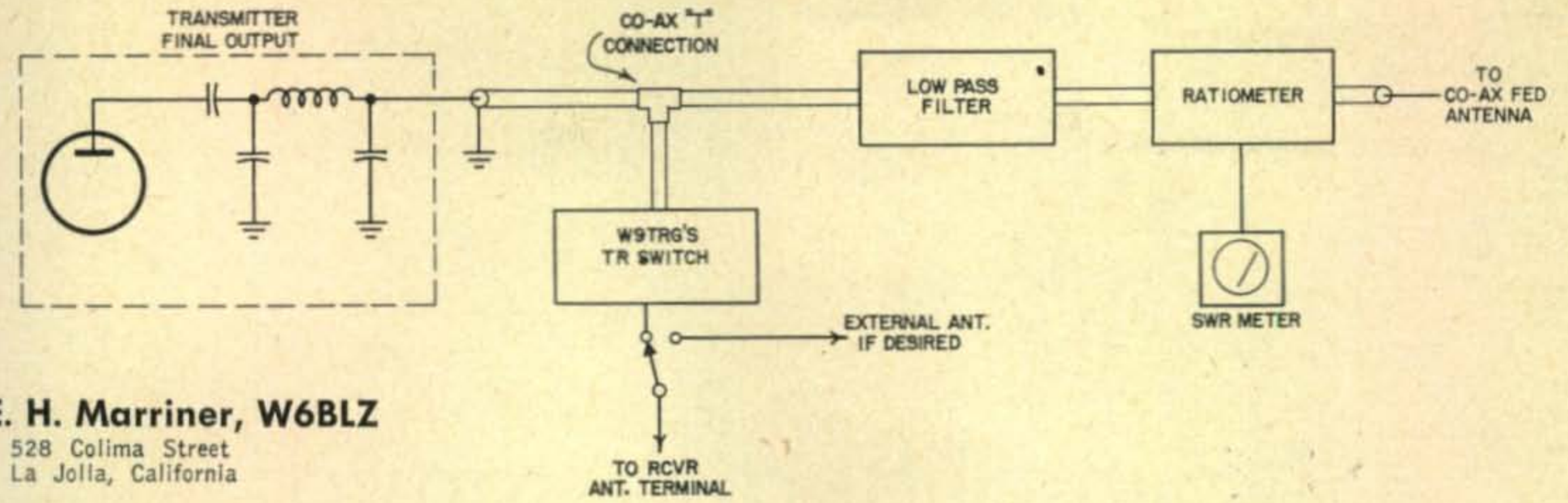
The inductance is easily duplicated by counting turns, and the capacity may be estimated by the amount of meshing of the condenser plates (if maximum and minimum are known). Small mica or ceramic condensers may then be substituted. The same system may be used for matching an antenna to the line or matching the output of a transmitter to the line.

An easily assembled test set consists of 10 turns of *#3014 B&W Miniductor* or *Air Dux #808* and a small variable condenser as in *fig 2*. The leads to the clips should be kept as short as practicable because they may become an appreciable part of the total inductance if one is dealing with a small mismatch.

The efficiency of an L-network is high so long as the ratio of impedances is low. In most cases the mismatch will not run over 3 to 1, which will require relatively small values of reactance. Specifically for a 2/1 mismatch in a 21 mc antenna at resonance, fed with a 52 ohm coaxial line, 3 to 4 turns with approximately 25 mmfd of capacity will bring the SWR to unity.

The components may be small, even with 1 KW input to a transmitter, provided that the mismatch is not too large. Some quick pencil work with Ohm's law will show the values of current and voltage encountered with low impedance lines. The miniductor is adequate and 600V mica capacitors will do in most cases. If something happens, such as an antenna falling down while the transmitter is running, you might cook a coil or blow a condenser, but with replacements a dime apiece that isn't too much of a catastrophe.

The bandwidth of such a network is excellent. In an antenna the resistive component of the impedance changes slowly with frequency, while the reactive component changes more rapidly. In a sense the L-network opposes these changes. Its Q is relatively low, with a resulting apparent increase in bandwidth of an antenna so fed. Of course, the bandwidth of an antenna is inherent in the structure itself, but from the viewpoint of the transmitter looking up the line, the terminal impedance changes much less, and the line will accept power more readily at the extremes of an amateur band. ■



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Modern Antenna Feedline Accessories

Thirty years ago amateurs just clipped the antenna on a turn of the copper tank coil through a .002 mfd condenser. I wonder if anyone then could visualize how many extra gadgets would be added between the tank coil and the antenna thirty years later? Modern amateur transmitters are now beginning to look more like Buck Rogers Rocket Rig than a transmitter.

Very many handy improvements are being added to the amateur transmitter. The accessories are becoming almost as large as the transmitter itself. Not enough publicity has been given recently for the average amateur to see the advantage of these gadgets. They are therefore not universally used at the present time.

TR Switch

The TR switch described by Cal Heisinger, W9TRG, in October, 1955, page 43, CQ Magazine seems to have been overlooked as a switching device to replace the antenna relay. One reason probably is due to the bad publicity on TR switches causing TVI or bringing in BC stations on the receiver due to diode rectification. The shortcomings of most of the TR switches was overcome in this article. A preamp was added giving a gain instead of a loss. The tuned circuits and low impedance outputs keeps the BC interference down. The isolation and biasing arrangement makes it safe to use on a KW. Having used Cal's circuit for over a year I cannot understand how anyone could be without one.

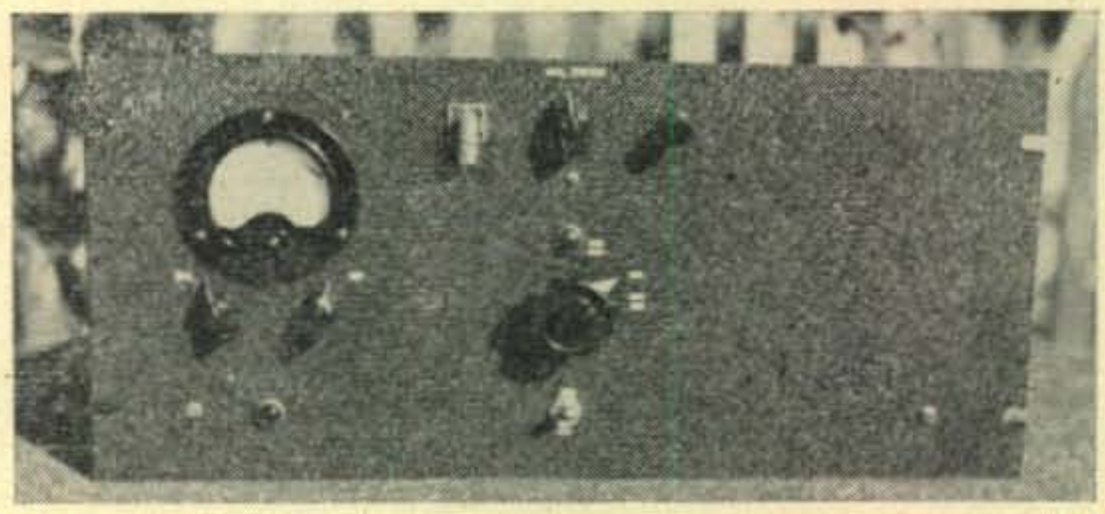
Ratiometer

Another extremely handy gadget is the ratiometer described in November, 1956, CQ, page 99. This can be left in the transmission line at all times. This is the first SWR indicator on the market which does not have to be taken out of the line or reversed except by a switch to read SWR. A potentiometer is used to reduce the meter current to prevent the needle pinning on SSB.

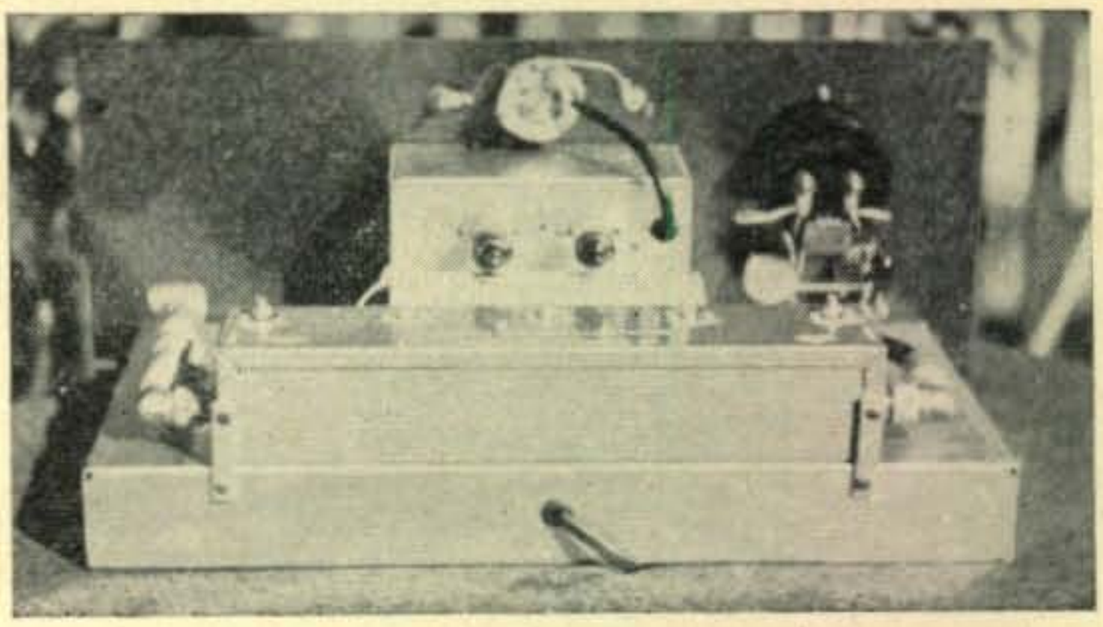
Pi-net finals

Modern transmitters tend to use pi-network output circuits. These, in connection with antenna tuners, make shifting frequencies rather complicated. The author is in favor of using co-ax fed antennas, such as co-ax fed dipoles and beam antennas, which eliminate the antenna tuner. A pi-network gives as much attenuation to harmonics as an antenna tuner. With this arrangement TR switching of the

[*continued on page 115*]



Front and back of finished unit.



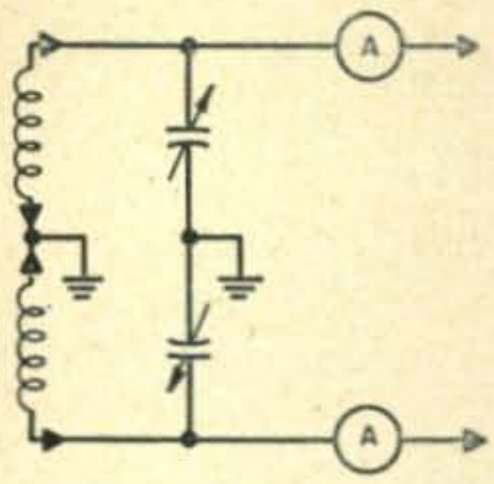


Fig 1

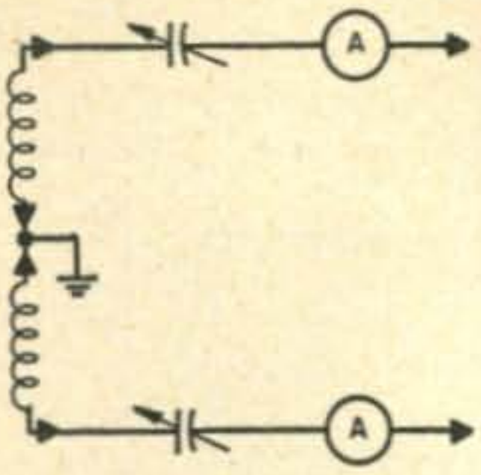


Fig 2

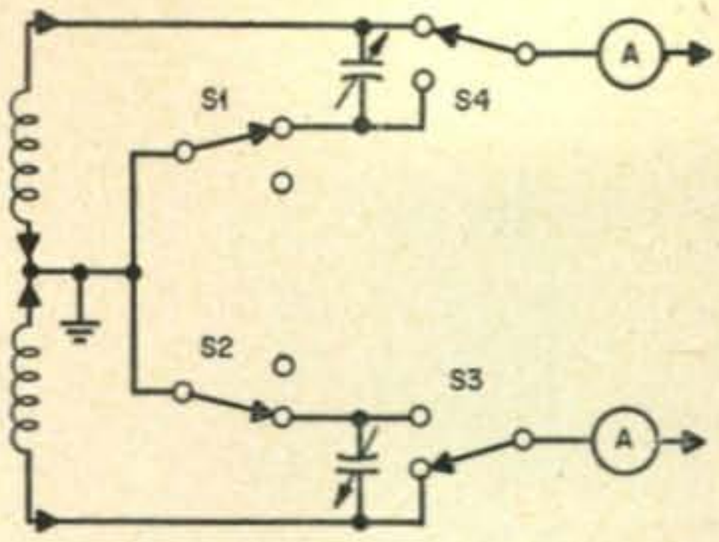


Fig 3

A Simplified Antenna & Tuner Circuit

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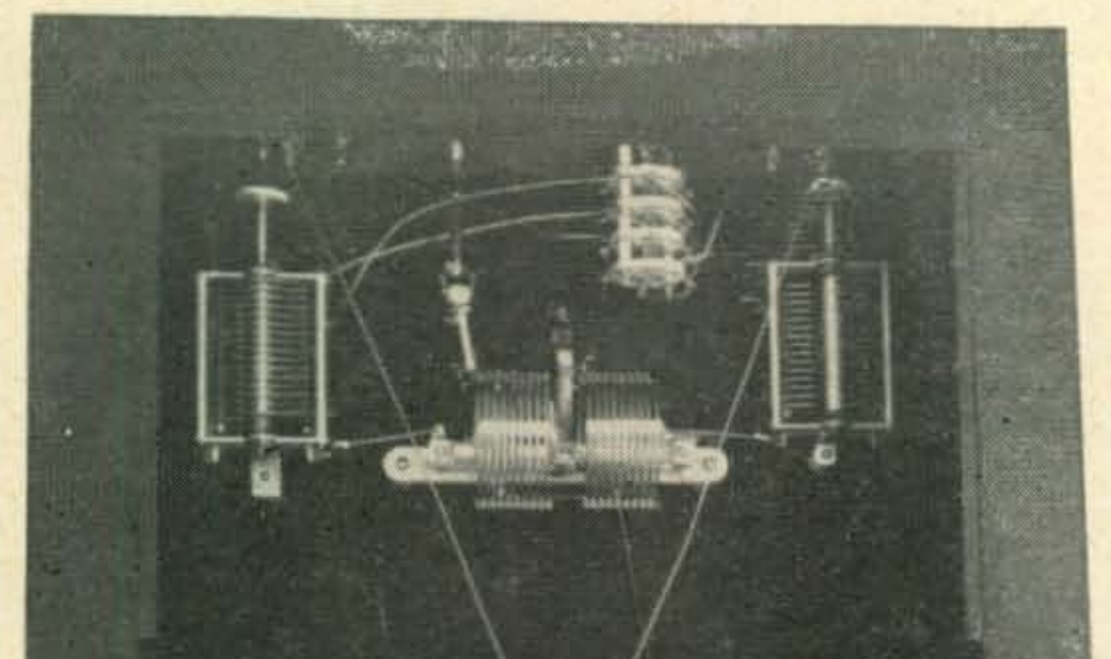
The advent of the compact Pi-Net output transmitters with their unbalanced output, and the new popularity of the old tried and true so called "Center Fed Zepp" antenna with its balanced feedline means an antenna tuner of some sort must be used. This raises the problem of switching the tuner from "Series" tuning for 80-75 meter operation, and "Parallel" tuning for 40-20-15-10 meter operation.

At W9PVD the "Zepp" is a 67½ foot flattop 30 feet high, fed with 33 feet of 450 ohm open wire TV line.



Front and Top views

At first, the switch from series to parallel tuning was made with alligator clips (four of the things, count them).

Being a "Band Hopper" (a nasty word in the minds of some of my Ham friends), and having a bandswitching receiver: a GPR-90, a bandswitching transmitter: a Ranger, "Why in the name of Marconi," says I, "should I have to go through all this rigamarole and change all these many clips in the tuner?"

Nothing was immediately forthcoming, but after the idea had spun 'round and 'round in the old "think tank" for many a moon, the present scheme was resolved.

Basically, the antenna tuner circuit is:

1. A parallel tuned circuit for 40-20-15-10 meters. (fig. 1.)

2. A series tuned circuit for 80-75 meters. (fig 2.)

The antenna is connected to the tuner through rf ammeters. The size dependent on the power of the transmitter. A 0-3 Amp. should be large enough for transmitters up to the 150 watt class (Ranger, Viking I & II, DX-100, B & W 5100, Collins 32-V series & others) as the only time they indicate current is in the series position as the other bands are voltage fed. On 75, the meters indicate 1.2 amps RF in each leg. This is with the Ranger loaded to 70 watts input. For parallel tuned bands a pair of NE-2 neon bulbs are mounted in rubber grommets (of course you could be real fancy and invest in pilot lights and remove the series resistor, or just use two of the alligator clips and clip on each wire) and one side only of the NE-2 is connected to the feeder. (Actually, *one* NE-2 would be enough, but we want a balanced look, don't we?)

The switch is wired as in fig 3, with a 4 pole 2 pos. ceramic rotary switch with 90° indexing.

The plug-in coils are B & W TVL series or Johnson 500 series, both fit the same jack

bar, which is equipped with a swinging plug-in link. A 3 turn link is used on 80-75-40, and a 1 turn link is used on 20-15-10. With the antenna here the 10 meter coil had to be reduced by 2 turns each side and the 40 meter coil reduced by 4 turns each side, all the others worked fine as is.

The condensers are surplus, and of about 150 mmfd each. They could be rigged up to both tune together, I suppose, if one had a dual right (or is it right and left?) angle drive arrangement. Mine are tuned with separate knobs. Insulated couplings *must* be used in either case, as the rotors will be "hot" with RF in the series arrangement. For the same reason, the condensers must be mounted on insulated stand-offs unless the rotors are insulated from the frame.

The results experienced with this antenna are nothing short of astounding to me, as most of the reports I get are: "That Ranger sure is doing a FB job", and it seems that I can most always get a QSO rain or shine. The only disappointment is DX-wise, but a little investigation disclosed a "Zepp" has a high angle of radation and DX work needs low angle radiation.

If you enjoy Rag Chewing (I'm still awaiting my RCC) like I do, I think you will find this the "ideal" antenna. Just look for me around noon and see how it sounds for yourself. ■

No Compromise

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The QRM problem on ten meters has influenced many of the boys to "take a peek" at eleven. Undoubtedly many liked what they saw, for tuning across the band will reveal that some of them have settled there.

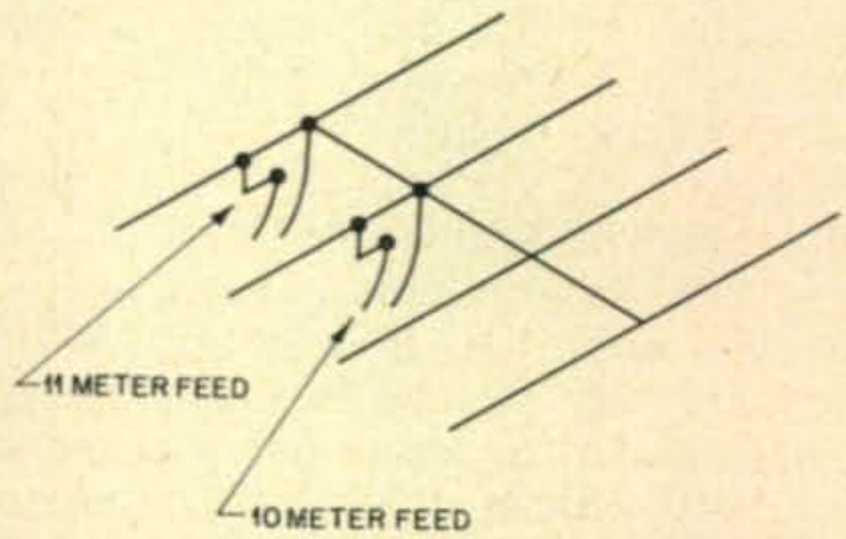
My four element wide spaced gamma match coax fed (from Orr's handbook) beam is cut for 28.5 mc. Although it did operate on 11 it was felt something better could be had. Casting about for a solution which would permit better operation on 11 but at no compromise to 10, the idea of an interlaced beam first came to mind. This was discarded after reviewing notes on previous attempts to minimize interaction on two previous dual arrays.

Final results found the present 10 m antenna left intact but with 11 meter power applied through a suitable matching system to the reflector of the 10 meter beam. Not only were 11 meter signals better but no detrimental effects were noticed on 10 meters.

The following parts were pre-assembled in order to facilitate attachment to the reflector while clinging to the tower.

30" aluminum rod ¼" dia.
aluminum strap, 1" wide, 9" long
aluminum can, 1½x1½x3"
small feed through insulator
flat metal plate ⅛x4x5" approx
2" exhaust pipe clamp
50 mmfd variable condenser

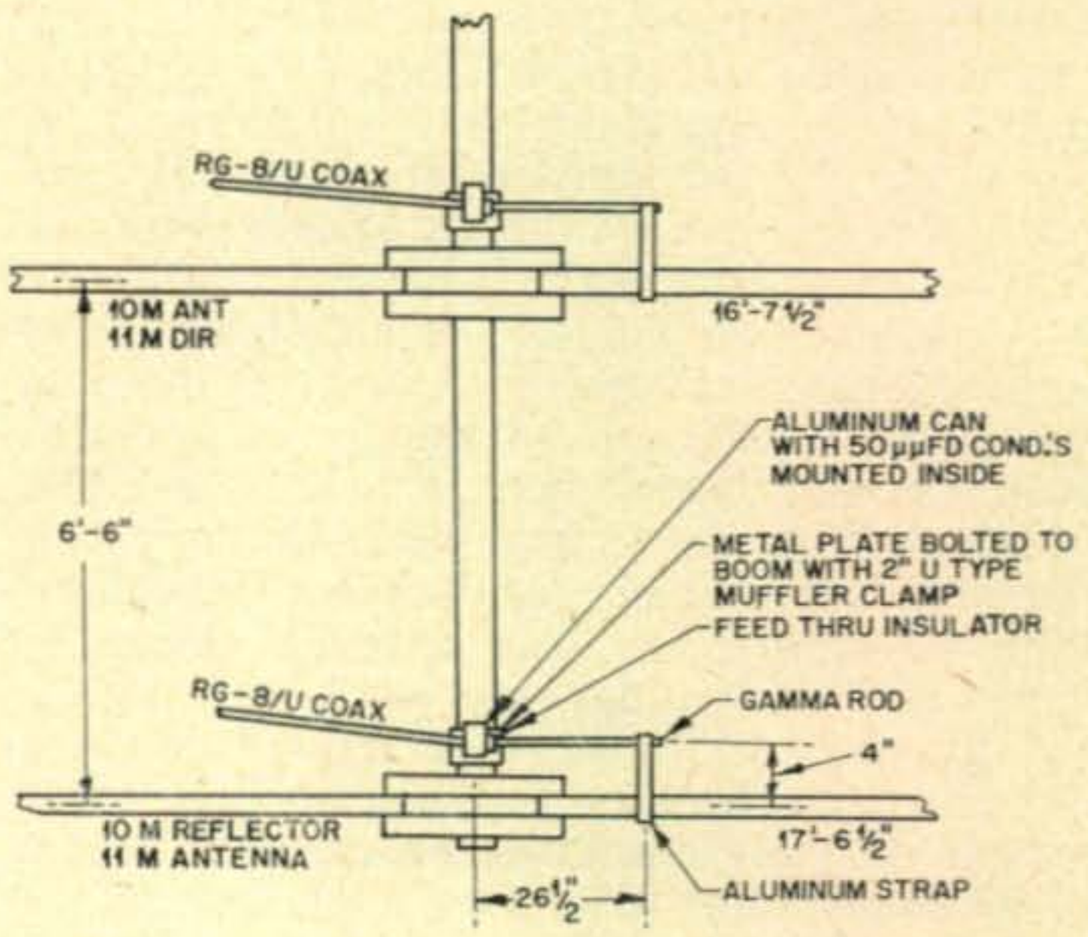
No difficulties were encountered during the installation of the gamma match to the reflector element of the ten meter beam. Total time involved, including lowering the tower and tipping the beam was approximately one hour.



Judiciously adjusting the gamma variable while the 14 year old harmonic shouted readings, a SWR of 1.3:1 was obtained on my beam while loading on 11 meters. The condenser was about 2/3 meshed and the gamma rod setting came out to 26½" at 27.1 mc.

Eleven meter signals as received on the 11 meter feedline show a 2:1 improvement over those same signals received on the ten meter feed line. An unexpected bonus was the front to back ratio of about 12 db.

Many of the ten meter beams used by hams are of the plumbers delight type and for the small amount of parts, cash and time the conversion to 11 meters is well worth the cost. Remember—this involves no compromise with 10 meter operation. ■



Ken (Judge) Glanzer, WØLMB/7
Boeing Aircraft Co.
Seattle, Wash.

more words on . . .

Antennas

You probably have wondered how some guys get these terrific signals and thought, "He must be running more than a KW," "I can't hear the DX station he's talking to, he must be talking to himself." As you may or may not know, 2 kw has only 3 DB more gain than 1 kw. I have heard hams belittle WØAJL (Denver) and his signal with the remark, "Well, he's got good efficiency with that Collin's KW1" and say nothing about his antenna. Let's stop and examine this point. It is true WØAJL has 76% efficiency or 760 watts *output*. Assume another ham down the street has a home-made KW with 50% efficiency or 500 watts output and exactly the *same* antenna. The difference between 500 and 750 watts is not 20 or 30 db but a measly 1.8 db. But if the antenna in either case were poor, 20 or 30 db could well be the difference.

Those oustanding signals are primarily due to a perfectly matched and resonated *"Home Brew"* beam. I consider Walt one of the best antenna men in the country and his signal tends to verify it.

A whole article could be written about WØAJL's 20m Imp. matching techniques and how the 760 Watt output figure was determined.

A number of hams have measured WØCVG's final down to the inch in an effort to duplicate his 75 meter signal by duplicating his final amplifier. The secret of his signal, if you could call it a secret, can be found by examining the antenna from the link on up rather than the final. He uses an "Inverted Vee."

A ham who accuses another of talking to himself or running more than a KW may be jealous and he certainly is showing his own ignorance. However everybody knows there are a few who exceed a KW. It's much cheaper to get the same gain out of the antenna instead of the transmitter and you will realize the same gain for all received signals as well. Increasing power doesn't help in *hearing* the DX any better. You got to hear them to work 'em.

Outstanding signals result from a combination of things such as antenna, location, height and matchings as well as power, good grounds and other factors. If you are willing to take the time to squeeze those extra db s out of your dipole or beam, your signal will be outstanding also. Don't let anyone tell you theory doesn't work.

There are certain principles one must keep in mind. In reading this, take it slow. It's not difficult, you may have to read it a couple of times, but you must understand it. Some of the least known and most important antenna concepts are described in this article.

First, let's discuss the impedance (Z) vs. height curve for a simple dipole which is the most important curve to have a working knowledge of. One of the first questions that usually comes up is, "What line should I use to feed the dipole or what is the Z of my antenna?" The Z changes as the dipole is raised or lowered to different heights above the ground.

The ARRL Antenna Handbook states (1949 Ed., page 48) "Waves radiated from an antenna directly downward reflect vertically from the ground, and, in passing the antenna on their upward journey, *induce a current in it* which will be in or out of phase depending upon antenna height. This is an important point, the *reflected* wave induces a current in the dipole. The magnitude and phase of this induced current depends upon the height of the antenna above the reflecting surface."

"The total current in the antenna thus consists of two components. The amplitude of the first is determined by the power supplied by the transmitter and the free space radiation resistance of the antenna. The second component is induced in the antenna by the wave reflected from the ground. The second component, while considerably smaller than the first at most useful antenna heights, is by no means inappreciable. At some heights the two components will be more or less in phase, so the total current is larger than would be expected from free space radiation resistance. At other heights the two components are out of phase and at such heights the total current is the difference between the two components." *This second component is the one that changes the impedance.* As the antenna is raised, the reflected wave becomes weaker and has less effect in changing the antenna's impedance as can be seen by the dipole Z curve on the large chart. A beam's Z is low because of the strong, inphase, and reflected component from the director and reflector.

The rotating of a beam will change the impedance and current slightly if the ground or reflecting medium is uneven underneath. See W6SAI, page 63, *Beam Antenna Handbook*.

If the antenna height is raised or lowered, a higher current at the feedpoint at the same value of power means that the effective resistance of the antenna is lower, and vice versa. In other words, power must always equal I^2R. If the power input is constant, and the radiation resistance (impedance) increases, the current at the feed point must decrease so that the value of P will be constant and still equal I^2R. Likewise if you raise or lower the antenna and the current at the *feedpoint* of the antenna goes up, the impedance or R must come down so that again $P = I^2R$ (assuming you're still at the resonate frequency).

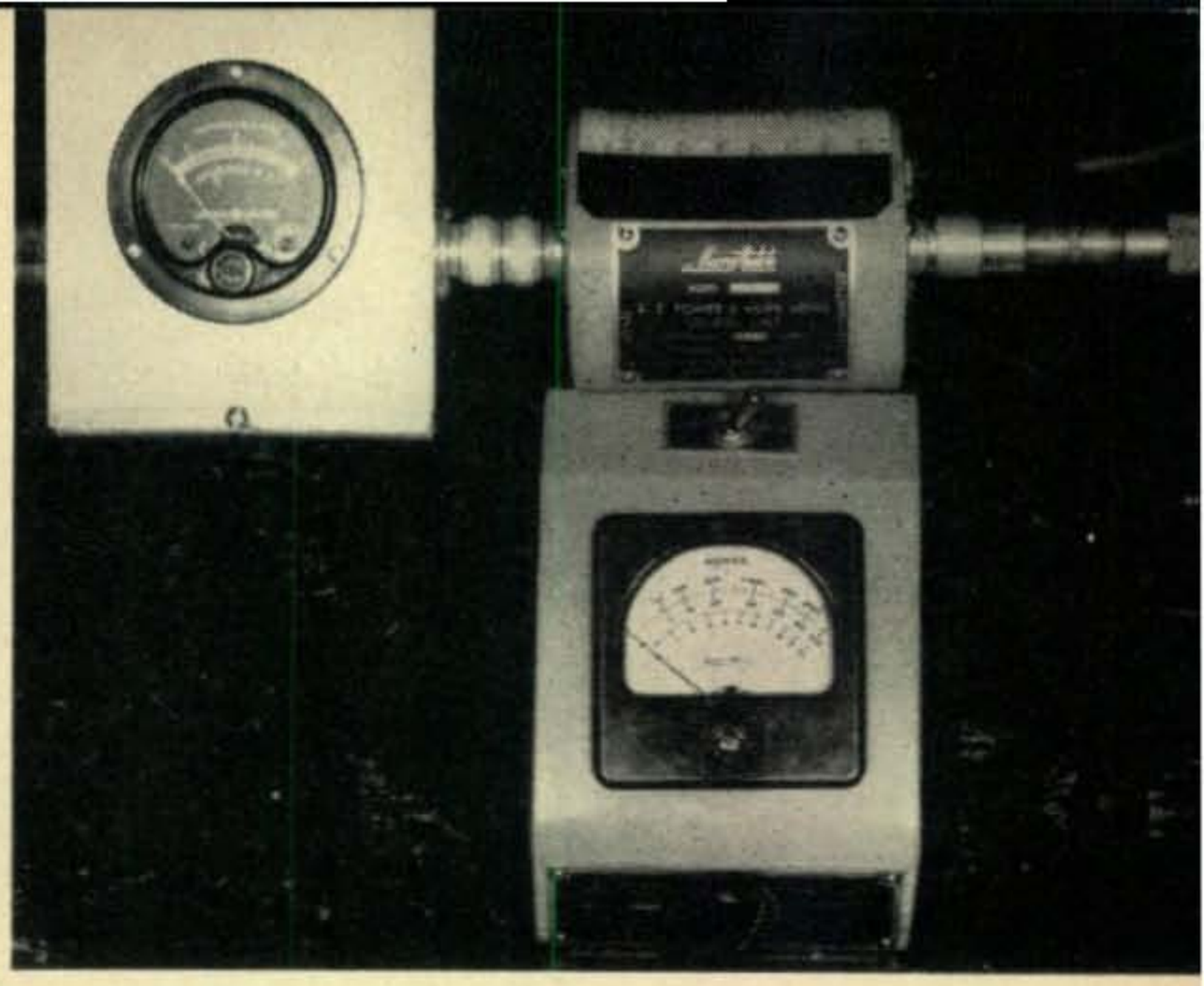
If an antenna that resonates at 3800 kc and has an SWR of 2::1 is operated at a frequency of 3900, it will have a higher SWR and less gain. How can this antenna compare to an antenna that not only resonates at *your* operating frequency, but also has an SWR of 1::1 or very close to it. This antenna can be loaded at the resonate frequency and operated 50 kc on each side without touching the final tank or coupling for most link coupled transmitters. Not only that, your low pass filter will attenuate the harmonies the most and the fundamental the least, if the SWR is very low. Remember low pass filters are rated at 1 KW if SWR is low.

Once you have heard the results of using such an antenna you will never feel right until all your antennas are the same. I have two 10 meter antennas that are switchable through a coax switch without touching the final because they are both matched and resonated.

Here is one way to check for reactance on a feedline caused by a mismatch or being off the resonate frequency if you are using a link coupled final. Disconnect antenna and dip final. Reconnect antenna. If you have to redip final it means you are tuning out the reactance the feedline has introduced. If final tank capacity was increased for dip, it means an inductive reactance was tuned out of the feedline and vice versa. You can get some idea of the degree of mismatch by the amount the final tank capacity is varied.

The Impedance vs. Height Curve shows the way the radiation resistance of the antenna is affected by the height of the antenna above ground. A ground system effectively establishes the height of the antenna insofar as the radiation resistance is concerned. Over *actual ground* the variations of Z will be somewhat lower due to ground losses which can be reduced by a ground system, but the chart shows the approximate magnitude of the change to be expected. If a ground system is used it should preferably extend at least a half wave length in every direction from the antenna.

I will use electrical ground heights for example purposes. On the top of the graph the heights above electrical ground in feet are given for various frequencies. Lower figures



Typical setup to measure antenna resonance.

are in terms of wave lengths. The important 52 and 72 ohm heights are shown for the various frequencies also. The depth of electrical ground below physical will vary, of course, but let's assume they are the same for the time being until the principles are understood.

Let's take a half-wave dipole starting at a height of 26 feet above electrical ground. Assume it resonates at 3800 (and this is not necessarily the frequency it loads the best either) and we wish to know the impedance of the antenna. Using the top figures we find 26 feet on the line to the right of 3800. From this point come straight down to the curve. You will notice that this corresponds to a height of .1 wave-length. Next a straight line from this point to the far right where the impedance values for a dipole, folded dipole, and a folded tripole are shown. The Z will be 25 ohms for a dipole, 100 ohms for a folded dipole, and 225 ohms for a folded tripole. See *fig. 1*.

A little higher on the curve at .13 wavelengths (34 feet) a *folded tripole* will have a Z of 300 ohms—a perfect match for 300 ohm line. See *fig. 2*.

This 3-wire tripole is extremely broad. It will have a *low* feedline loss because the Z is high and the current is low. These antennas

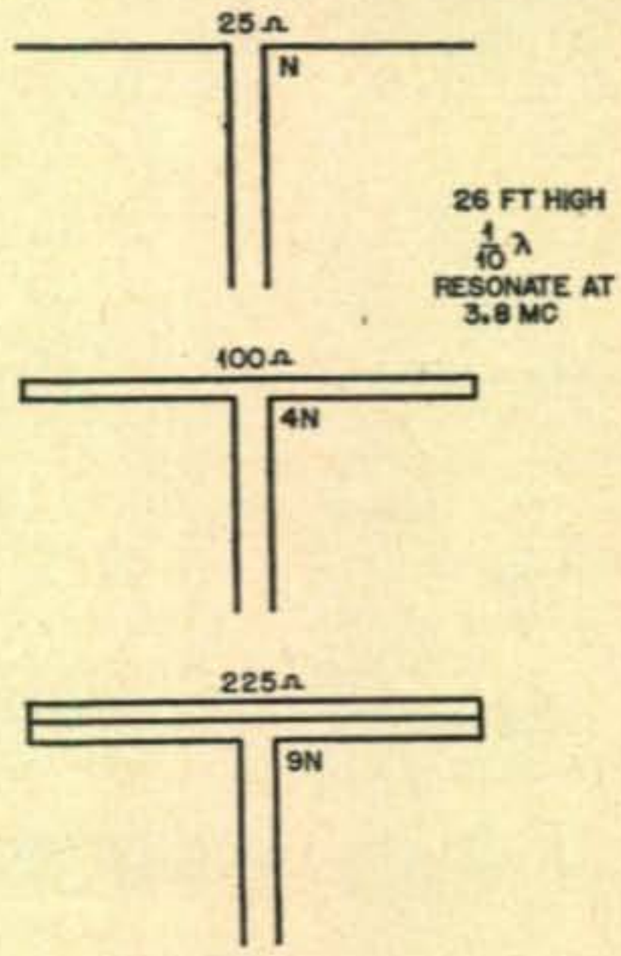


Fig. 1.

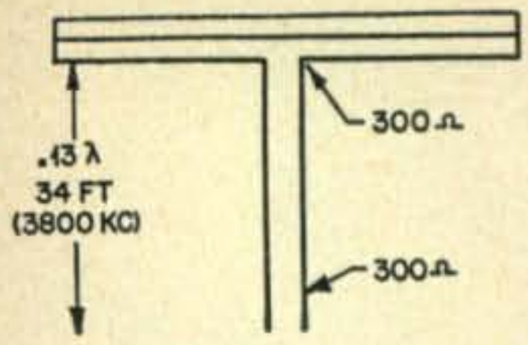


Fig 2.

are often fed with 600 ohm line as recommended by the handbooks, but at a height of 34 feet, it is a 2:1 mismatch. A little higher on curve at .18 wavelengths it can be seen that a 3-wire tripole would be a perfect match for 450 Z line which is commercially available, open wire too. With this type of antenna the current would be very low in the feedline also; therefore, long lengths of feedline could be used if needed.

A little higher on the curve and the desired 52 ohm impedance point for a dipole occurs. Following the broken line up this value of impedance (52) 1st occurs respectively at 93, *47*, 25, 13, 8, and 6 feet on 160, *75*, 40, 20, 15, and 10 meters for a dipole. *47 feet at 3800*. This 52 ohm height of 47 feet has checked out on several antennas. The last one I checked was W7RSY/6's (Doc Hemington), now K6TSR in Santa Anna.

For 600 ohm line feed to a folded tripole at a height of about .23 wavelengths or 60 feet would be necessary for 3800 kc.

Next the famous 72 ohm point. This value of impedance 1st occurs at a height of 130, *65*, 34, 19, 12 and 9 feet on 160, 75, 40, 20, 15 and 10 meters. This point is a $\frac{\lambda}{4}$ or *quarter wavelength in height*. So for a perfect match to a dipole with 72 ohm line resonated at 3800 kc the height should be 65 feet above electrical ground—perhaps 60 feet above physical ground.

Just a little higher the 75 ohm point for a dipole and also the 300 ohm point for a folded dipole are found on the curve. By following the broken line across the page, a dipole or a folded dipole at any of the heights will have an impedance of 75 or 300 ohms and a perfect match for the respective feedlines.

At the high point on the curve .36 wavelengths above ground the Z will be 95 ohms for a dipole. In actual practice due to ground losses it will be a few ohms less. A folded dipole at that height would have an Z of 380 ohms.

Continuing on down the curve, we see at a height of *one-half wavelength*, $\frac{\lambda}{2}$, the Z is again 72 ohms—now at 130 feet in height. Farther down the curve at (.6) wavelength the Z goes as low as 56 ohms. A folded dipole at a height of 83 feet on 75 m. or 42 feet on 40 m. would have an impedance of 224 ohms.

At a height of $\frac{3}{4}\lambda$ the Z is 72 ohms again and at a height of one wavelength the Z is again 72 ohms and for every multiple of $\frac{\lambda}{4}$ this is again true. This is an important point to remember. *A dipole or folded dipole has a Z of 72 or 288 ohms at multiples of one-quarter wavelength in height above electrical ground.* Thus it is possible to select an optimum height for best angle and radiation and best matching of impedances. W6SAI did not elaborate in his *Beam Antenna Handbook*, page 24, where he said "For a simple half-wave dipole the radiation resistance at the center is about 72 ohms when the dipole is located *one-half* wavelength above a good ground surface." He is correct, of course, but not complete. If that were all the average ham knew he would think, "That means I'll have to have my 75 meter dipole 130 feet high in order to get a match for 72 ohm line." He could also do it at 65 feet.

Another rule of thumb should be emphasized here. A folded dipole's impedance will be *four times that of a dipole at the same height*, and a folded tripole will have an impedance of *9 times that of* a dipole at the same height. Also use $\frac{492}{\text{Freq}}$ for determining height above ground or beam spacing, not $\frac{468}{\text{Freq}}$.

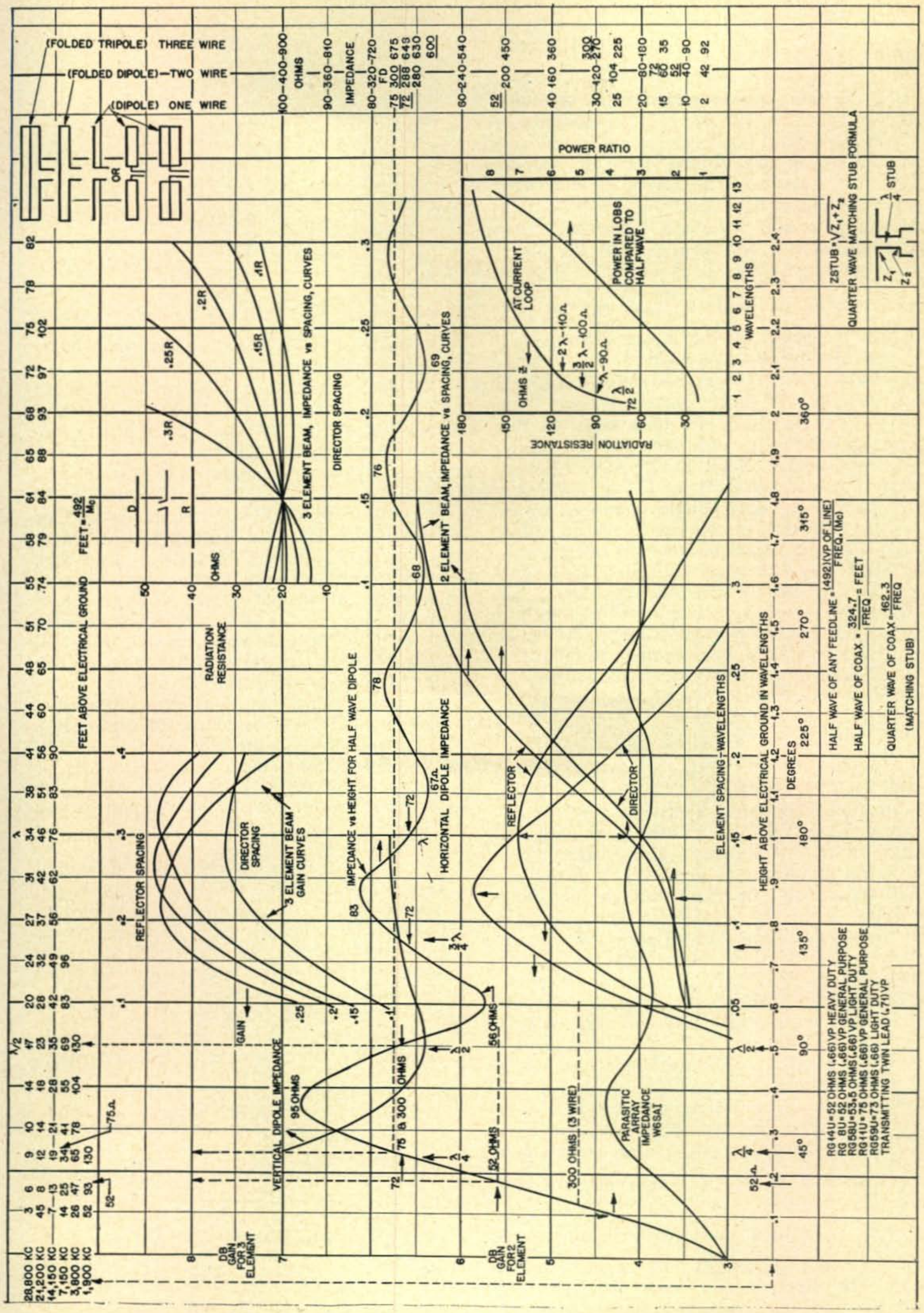
If you have a flat line (SWR = 1:1) regardless of what feedline used the impedance, current and voltage are constant throughout the entire feedline. Because of this fact an RF ammeter can be inserted at any point in the feed line and will read the same value providing it doesn't upset the line. Using this measured value of current the *power output* of your transmitter can be calculated from $P = I^2R$ where R = impedance of feedline.

If you have an antennascope and half-wave pieces of feed line for the various bands or a SWR bridge, you can measure your dipole's Z very quickly and after comparing your estimated to measured values of impedance on several antennas, you will be able to estimate very accurately the effect of surrounding objects on future antennas.

To illustrate the discussion above, let's take an actual example.

I estimated my 40-meter dipole's Z right on the nose. The dipole center was at a height of 35 feet although the entire dipole was at an angle of about 30°. The ground was paved concrete. The concrete has wire screen in it for strength. Although the wire was not connected to the ground directly, I figured it would act as the ground. The street is about 50 feet wide, but the antenna was strung at about a 45° angle across it so that the antenna was well inside the outer limits of the street.

From the chart 34 feet is a quarter wave $\frac{\lambda}{4}$; hence Z = 72 ohms at 7,150 kc. I connected a half wave $\frac{\lambda}{2}$ of 52 ohm coax



Antenna information chart

$\left(\frac{492}{7.150} \times .66\right)$ = 45.4 feet, to the feed point and the other end to my antenna scope, twisted the dials of the grid dip and antenna scope and, presto, 73 ohms. I ran downstairs and tuned across the 40 meter band to find the grid dip signal and, presto, there it was at 7,145 kc. I might add that the 52 ohm *half wave* stub could have been 72 or 300 ohm line because a half wave will reflect the same impedance at one end as it sees at the other end regardless of the Z of the line; providing the coax is half a wave $\frac{\lambda}{2}$ at the resonate frequency of the dipole. This is not too critical, but *the closer the better*. I have had a deviation of 100 kc between the two on 75 meters and still got the same Z value. I then connected a length of 75 ohm coax to the dipole just long enough to reach into the shack. Using my Johnson SWR bridge with 75 ohm resistor I got an SWR of 1.01:1 at 7,143 kc. The antenna's physical length happened to be just right for this measurement. When using an SWR bridge the coax length is not critical. The SWR was very, very close to 1 to 1. The problem that always occurs when using an SWR bridge is whether the Z is above or below the Z of the line. All you get from the bridge is the ratio of mismach. For example, say that the lowest SWR you get is 1.3 to 1, what's the Z? It

(52 or 75) (Resistor in bridge must be same value)

$$Z = \frac{\text{(Feedline Z)}}{\text{SWR}}$$

could be Z = 52/1.3 = 40 ohms or Z = 52 x 1.3 = 67.5 ohms. You would use 75 instead of 52 if you used 75 ohm coax with the bridge and 75 Ω Resistor. This is one place where the graph comes in handy or if the estimation wouldn't be close enough the thing to do is *lower the antenna a few feet and take another reading*. From these two readings you can tell just where you are on the curve. When the SWR is around 1.1 to 1 the method of lowering the antenna and taking another reading is about the only way to determine whether or not the Z is above or below the Z of your feedline, that is, just using an SWR bridge.

The second Z vs. Height curve is that of a vertical dipole. The center of the dipole is used as the measuring point. The curve starts at a quarter-wave $\frac{\lambda}{4}$ in height because one leg will be a quarter-wave $\frac{\lambda}{4}$ long minus the .025 end effect length. For instance, on 40 meters the dipole center would be 34.4 feet high at 7,150 kc. The total length of a dipole at 7,150 is 468/7.15 = 65.5 feet. The center will be 34.4 feet high. See also *fig. 3*. A quarter-wave $\frac{\lambda}{4}$ is 34.4 feet, but a quarter-wave of dipole antenna is 32.7 feet, so the end will be 1.7 feet above the ground.

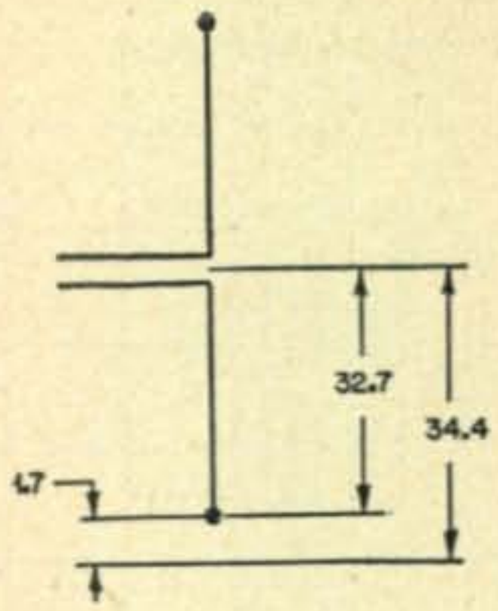


Fig 3.

The next curves are the 2-element beam gain curves. The gain is read on the left and the spacing on the bottom. For a driven element and a director the maximum gain, 5.8 DB is at a spacing of about .115 wavelengths or (492/14.2) (.115) (2) = 7.98 feet on 20 meters. For a reflector the maximum gain of 5.3 db is realized at a spacing of .15 wavelengths or (492/14.2) (.15) (2) = 10.4 feet. *Gonset* uses 10 feet spacing on their Bantom Beam. The impedance curves will give a Z of about 15 ohms for the director. If a folded dipole is used as a driven element the Z will be about 4x15 = 60 ohms. If a 3-wire or conductor dipole is used the Z will be about 9x15 = 135 ohms. The Z using a reflector at a spacing of .15 will be about 25 ohms If a folded dipole is used the Z will be about 100 ohms. This would provide a good match for series 52 ohms coax (104 ohm). The line would be balanced, high Z, low ignition pickup and low loss due to lower currents. See also *fig. 4*.

There is one thing to remember now that is very important. The Z's I just quoted will be found only if the beam is at multiples of one-quarter wavelengths high. In other words *if* the driven element were suspended alone the Z would be 72 ohms for a dipole or 288 ohms for a folded dipole and 648 ohms for a 3-wire dipole. The beam Z from the chart will hold only if the beam is at a quarter wave multiple of height. The approximate impedance values

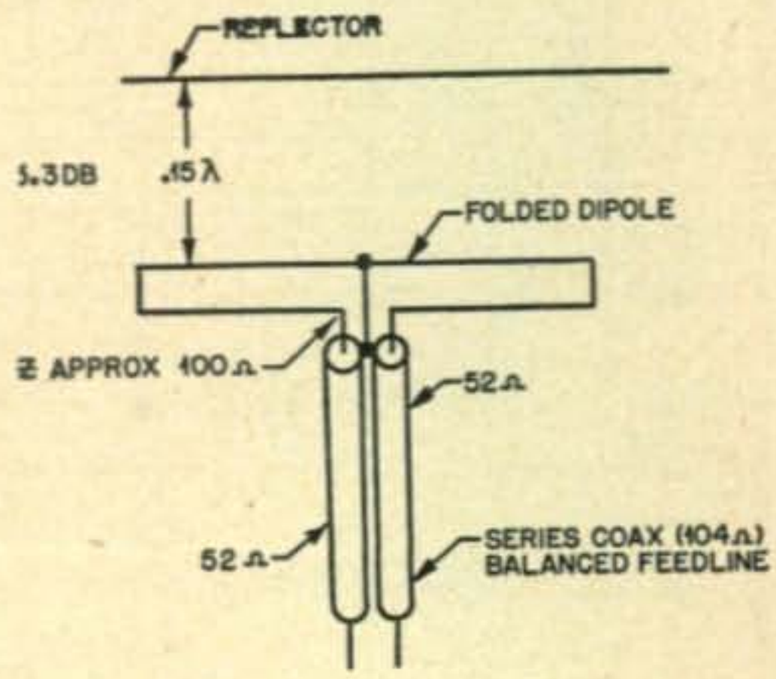


Fig 4.

to be expected are given by the parasitic array impedance curve at the bottom of the graph. The amount of deviation from this value will depend on what part of the curve your antenna impedance is. For instance, assume a 20-meter 2 element beam is 42 feet high, a common height. The Z of a beam (.15 spacing), using reflector, will not be 25 ohms. The Z of a dipole alone at that height (42 ft.) is only 56 ohms, so it will probably be around 20 ohms. For a 3 element parasitic array the Z will be about 16 ohms. *These Z values will not be of any importance* if *you are using a T or a Gamma match or W6TTB's tuned feeders.* Yes, W6TTB's 15 meter beam uses tuned feeders (300 ohm or 450 ohm) and this is a system that should not be overlooked. If you have heard W6TTB's, W6OZC's or W5HBV's 100-watt 15-meter signal you will stand up and take notice. These Z values will be of importance if you use quarter wave stubs to raise the Z, so a higher Z line can be used the rest of the way. The only thing left then is to

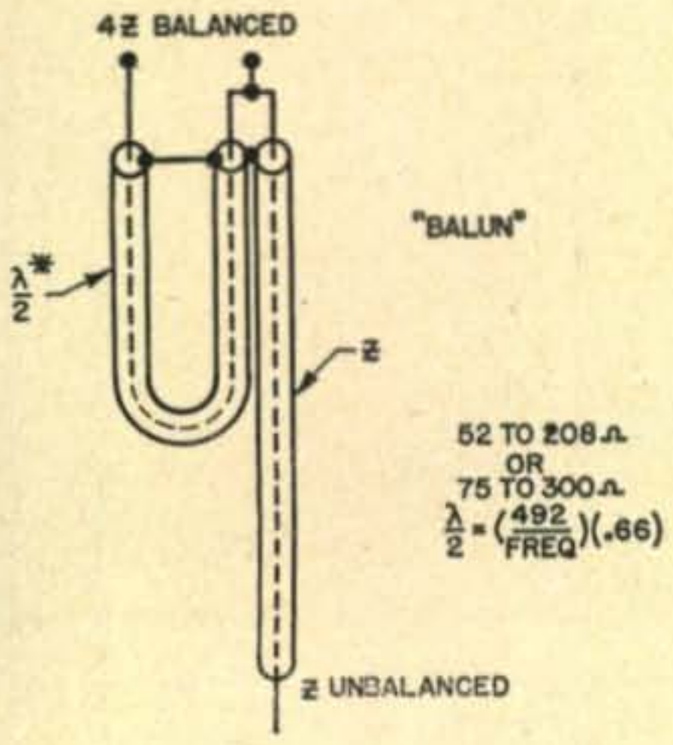


Fig 5.

adjust the T or Gamma correctly and that can be very quickly done with an antenna scope or an SWR bridge. For complete adjustment of T or Gamma match refer to W6SAI's article in *CQ*, Oct. '53. "Terrible T and Gamma Too." Or his *Beam Antenna Handbook*. Do not fail to read this.

One of the most popular feed systems now for a beam is the T match with a "Balun" on the end of the coax. With this the Z of the feedline is raised 4 times at the feedpoint and in addition it makes a balanced feedline out of an unbalanced feed line, *fig. 5*. It also stops any RF from coming back down the shield and radiating vertically polarized waves, one cause of TVI.

A Balun coil is just a half wave of line taken from the chart. Be sure to calculate the various VP's if you figure the length yourself.

Next are the 3-element beam gain and impedance curves. What spacing will give maximum gain? Example, if director is spaced at .2 λ the reflector will have to be spaced at .25 λ or D.25, R.2 or D.15, R.3 λ. A beam using these spacings will be very broad over the entire band also. The Z will be about 30 ohms in the first two cases.

The impedance values are of no importance if you are going to use a T or Gamma. The values given are for a split-driven element. Example, D.15, R.25 Z = 20 ohms *if beam is at multiples of* $\frac{\lambda}{4}$ *in height.* Refer to W6SAI's parasitic array impedance curve, vs. height on graph for most close and medium spaced beams (*Beam Antenna Handbook*, page 24).

Next, is Z at current loop vs. length of wire in wavelengths? Assume *fig. 6* (A) a $\frac{\lambda}{2}$ dipole at any $\frac{\lambda}{4}$ multiple in height. The Z is 72 ohms at the current loop. Assume a piece of wire at the same height a wavelength long (B). The Z at the current loops is no longer

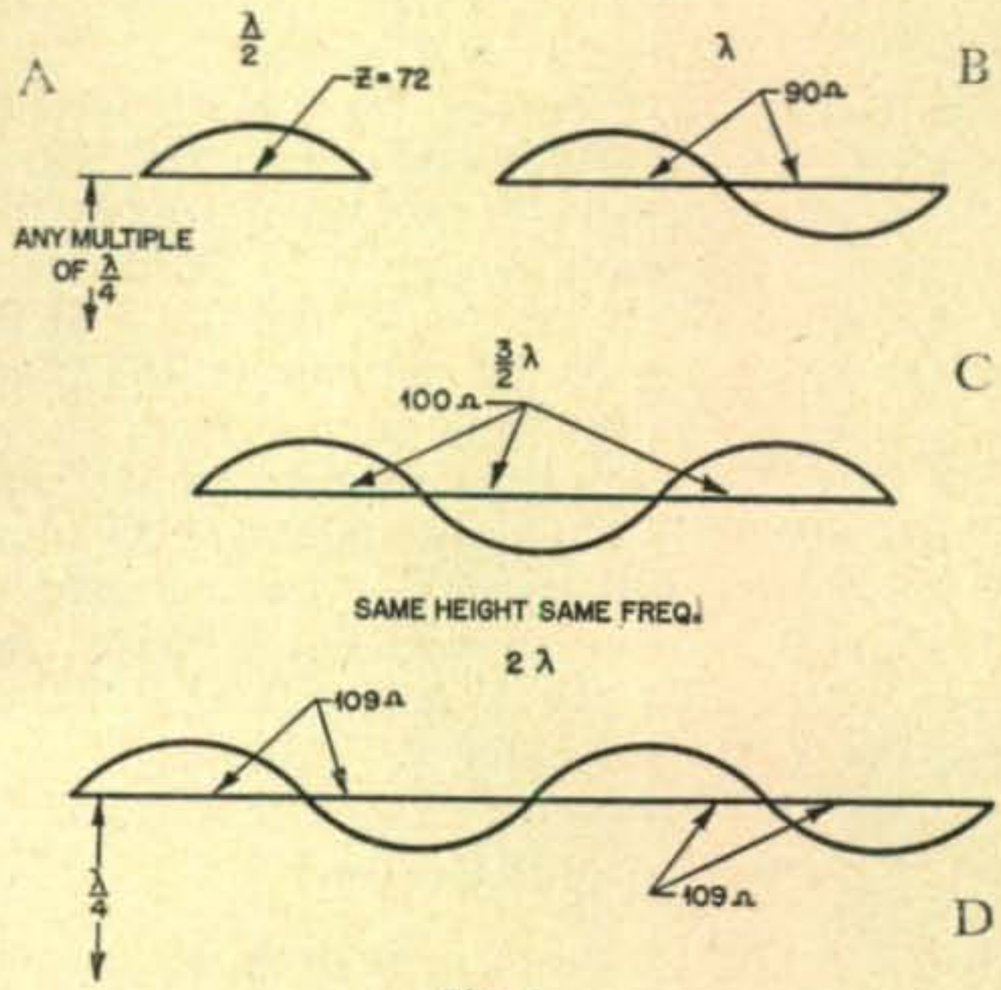


Fig 6.

72, but about 90 ohms from graph. Assume a piece of wire a wavelength and a half long (C). The Z at the current loops is now 100 ohms. At (D) antenna is 2 wavelengths long and the Z is about 109 ohms at the current loops.

Likewise if a half wave dipole on 80 is a $\frac{\lambda}{4}$ high, the Z is 72 ohms at the current loop. If the same antenna is used on 40 meters, it is now a half wave in height and a full wave long with the Z at the current loops equal to 90 ohms. If used on 20 meters the same antenna is 1 wavelength high and the Z at the current loops is now equal to 109 ohms (*fig. 7*). Assume a 40 meter dipole (quarter wave high, 72 ohm) (resonates at 7,100 kc) is used on 15 meters, where it will be one and a half wavelengths long. Unfortunately it will not resonate at 21,300, but at 22,000 and have

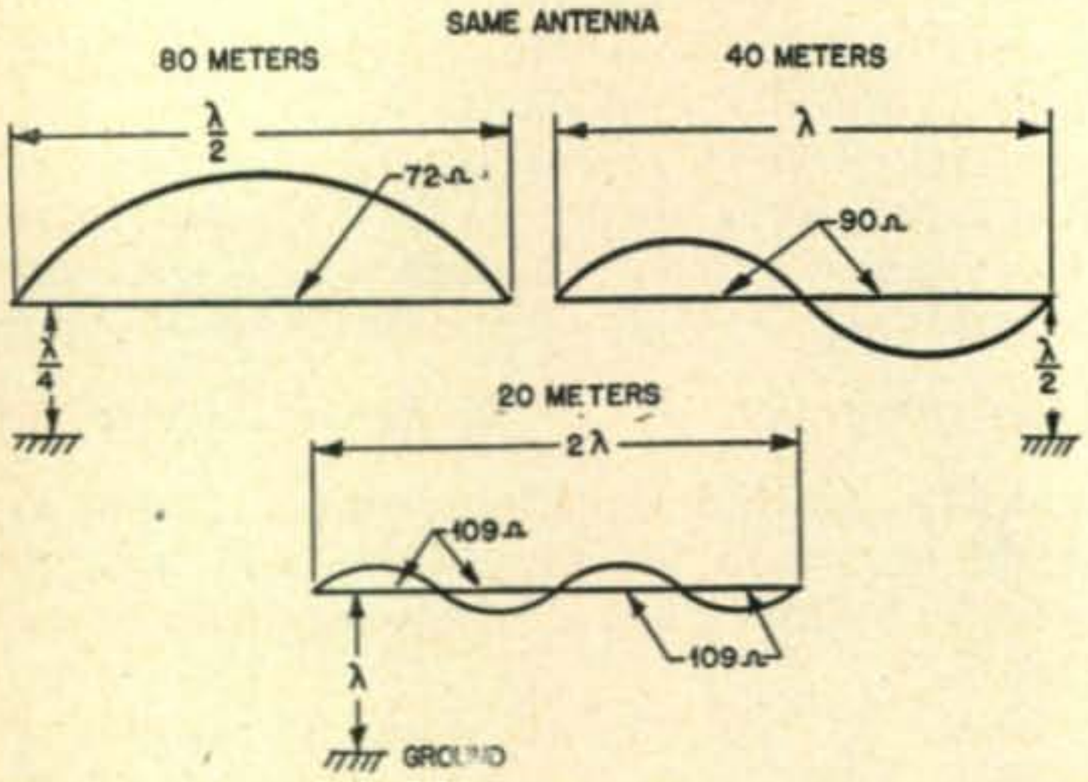


Fig 7.

an impedance of 100 ohms. The 100 ohm value will be correct only if on 40 M the antenna is at a quarter wave multiple in height. For harmonic antennas use formula

$$\text{Feet} = \frac{492\ (N-.05)}{\text{Freq.}}$$

where N = number of half waves.

The theory and curves for (Karl Dreher, Denver, Colo.) WØWO's off-center fed 300 Ω windom antenna were drawn on the basis that a harmonic antenna's Z stayed at 72 ohms at the current loops. If that were true the Z at the physical 1/3 mark of the antenna is 265 ohms each band. Actually the Z at the feedpoint is higher than 265 each time another higher band is used, but it is close enough to 300 ohms and may very well be 300 ohms on one of the bands. It is also assumed at the lowest frequency used, that the antenna is at a height where the Z at the center is 72 ohms.

Electrical Ground

How electrical ground is determined. A simple example—If dipole is resonate at 3800 and is at a height of 60 feet and the measured Z is 72 ohms, the procedure is this. From the graph it can be seen that a 75 m. dipole resonate at 3800 should be 65 feet high for a Z of 72 ohms. Therefore, *electrical ground* is 5 feet below physical ground. Nearby objects, of course, affect this and in some cases you may find that electrical ground may be a foot above physical ground. The nearby objects in this case had enough effect on the antenna to do this. If the nearby objects are metal the wave will reflect off of them and as far as the antenna knows that is electrical ground or the reflecting medium.

A Micro-Match SWR bridge really simplifies tuning up a mobile whip. All you would do is adjust taps on coil for lowest SWR at the operating frequency. An all-band coil can be resonated on all bands accurately in fifteen minutes' time. If you have ever tried to resonate a mobile coil without an SWR bridge you would really appreciate this feature. With the bridge there is no guesswork and it makes things so easy to say nothing of what it does for the home station antenna. The Jone's Micro-Match is made to order for use between your transmitter and the Johnson Match Box.

And the 75 Ω and 52 Ω resistors in the Johnson bridge. Solder these quickly. It helps to put a clip on the wire before the resistor to absorb the heat.

I use a portable antenna scope and grid dip. This battery pack idea really pays off and is so simple. I got tired of running a 110 volt extension cord all the time so I rigged this up. (See *fig. 9.*)

I usually make three and sometimes four way checks on the mobile whip's Z and resonate frequency. First I connect it directly to the base of the mounted whip. Second at the end of a half wave of coax cut to the operating frequency. Third at the end of a quarter-wave of coax. Be sure to use quarter wavelength matching stub formula when making Z measurements with quarter wave stubs.

Z stub = $\sqrt{Z_1 Z_2}$ quarter wave measurement example.

Using 53.5 ohm coax (RG58U) quarter wave stub, assume ant. scope reads 75 ohms. This means that the Z of the antenna is lower than the Z of the stub. $53.5 = \sqrt{Z_1 .75}$ or $2852 = 75Z_1$ or $Z_1 = \frac{2852}{75}$ Hence $Z_1 = 38$ ohms (antenna impedance). On the other hand if the antenna scope would have read 38 ohms the Z of the antenna would be higher than the Z of the stub. In this case the Z of the

$$\frac{\text{Stub Lengths (492) (.659)}}{\text{Freq.}} = \text{Half Wave}$$

Freq. kc	¼ wave	½ wave
3800	42′ 7.8″	85′ 3.6″
3850	42′ 1.2″	84′ 2.4″
3900	41′ 5″	83′
7050	23′	46′
7100	22′ 9.6″	45′ 8.4″
7150	22′ 8″	45′ 3.6″
7200	22′ 6″	45′
7250	22′ 3.6″	44′ 8″
14100	11′ 6″	23′
14200	11′ 5″	22′ 10″
14250	11′ 4″	22′ 9″
21100	7′ 8″	15′ 4″
21200	7′ 7.6″	15′ 3″
21300	7′ 7″	15′ 2″
28500	5′ 8″	11′ 4″
28750	5′ 7.7″	11′ 3″
29000	5′ 7″	11′ 2″
29500	5′ 6″	11″

Fig 8.

antenna would be 75 ohms. $53.5 = \sqrt{Z_1 38}$ or $\frac{2852}{38}$ $Z_1 = 75$ ohms..

This is a very important concept to understand. This, of course, with the antenna scope and grid dip. The final check of Z and resonate frequency is with the SWR bridge. When you get all four to check, brother, that's it.

Don't be surprised if the antenna doesn't load easy. Remember the transmitter is working into a resistive load. If it loads real easy be a little leery about it especially if a very small change in loading makes a large change in the plate current. The antenna scope makes a very good mobile field strength meter that can be connected to the B.C. antenna. When using an r-f ammeter note that at the resonate frequency the current will be the lowest and on either side the R.F. current will be higher for the same power input.

Example, the R.F. current value to expect will depend on SWR, Z of feedline, power and, of course, how far off resonate frequency you are. On 15 meters my whip's Z is strangely enough 52 ohms exactly. I run 40 watts. The *power* output can be found like this if the line is flat. My R.F. current is .75A, $P = I^2R$, $P = (.75)^2 \times 52 = 29$ watts output minus the loss in the coil and feedline. Yes, I have just .75 amperes in the line, but it's a purely resistive load. On 75 m, I use a $\frac{\lambda}{4}$ stub and the Z at the R.F. ammeter is 150 Ω. The Z at the antenna is 18 Ω. The current in the R.F. ammeter is .45 amperes. $P = I^2R$, $P = (.45)^2$ $150 = (.202)\ (150) = 30.3$ watts output minus the loss in the coil and feedline.

I have two Jones' Micro-Match VSWR bridges and I don't know how I got along without them before. The Johnson SWR bridge works fine but the Jones' bridge can be left right in the line for a mobile antenna or a fixed KW station. It's the only thing.

There is a way to tune up a mobile antenna without the use of a bridge, etc., that works out very well because the antennas are generally sharp tuning. I have found many times that the resonate frequency is not the

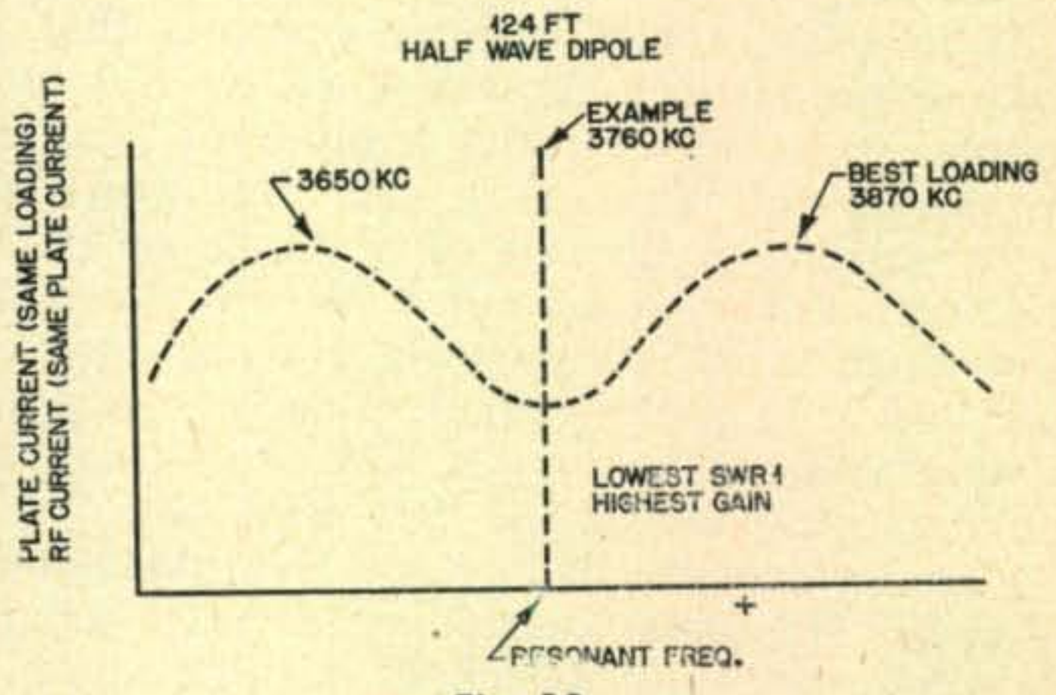


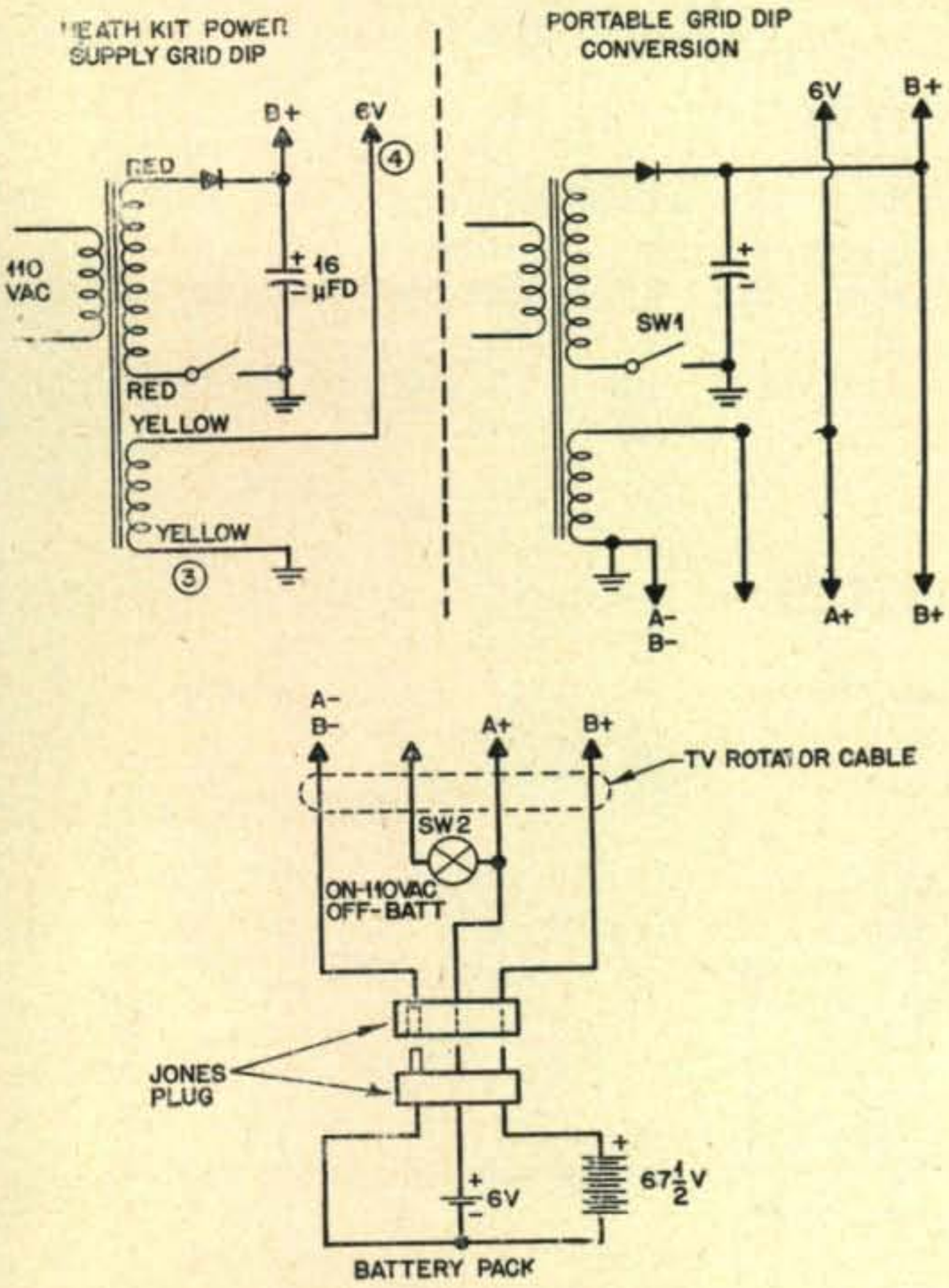
Fig 10.

frequency where the antenna loads the best using link coupling. The antenna will load the best on either side of the resonate frequency something like that shown in *fig. 10*. Also the RF current in the feedline is the lowest at the resonate frequency and increases on either side and then drops off. The plate current does the same. One way to check for a high SWR is as follows: If a very small increase in the link coupling causes a large change in plate current, this means the SWR is high. A matched and resonated antenna is harder to load. The procedure to use is to start at one end of the band and load it up at 50 kc intervals and observe the r-f current in the antenna for the same plate current loading or observe the plate current for the same loading.

The South Dakota net meets on a frequency of 3870 kc. WØDKJ, WØGWA and WØEXX had dipoles that loaded the best at 3870 but upon checking their antennas with my equipment I found the resonate frequency to be 3760 kc not 3870 kc. The lengths were 124 feet. According to formula that length was just 6 inches short for 3760 kc. We shortened the antennas and now they resonate—one at 3850 and the other two at 3860 kc and they are very happy with the way they get out now.

I wouldn't feel right if I didn't know what the Z of my antenna was. It's so easy to find out with an SWR Bridge too. I wouldn't put a high power rig on unless I had my antenna at least 70 per cent efficient. I would be too embarrassed to have some low-power guy with

Fig 9.



a matched antenna cover me up. How many times have you heard a V3 or Viking II cover some high-power boy up. Have you ever stopped to think of the power wasted in a year's time because it's not being radiated but dissipated in the form of heat. It's enough to pay for an SWR Bridge easy. If some guy with a matched and resonated antenna with 250 watts can do the same as a KW with an average antenna he not only saves the 750 watts of RF but the extra power to the modulator, to say nothing of the cost of the extra transformers, etc., which can easily run into hundreds of dollars.

Just stop and think what a waste of money it is to have a KW and an antenna that is wasting just 3 db of power when by adding a couple of inches or using a different feedline or raising the antenna a few feet you can easily squeeze 3 db out of a dipole or beam and oftentimes even more. 3 db down is equivalent to a 500 watt rig and an antenna that has 3 db more gain than yours does, assuming you are running a KW. Just think of the money saved by the 500 watt boy.

I use an oversize dial on my Heathkit antennascope. This must be calibrated by an accurate ohmmeter and checked at least once a month. It will change!!!!

A back-to-back connector for use on the antennascope can be obtained from the Dow Key Co., Inc., Warren, Minnesota—$1.85. This is used when measuring the Z right at the base of the whip. Two regular male coax connectors can be used back-to-back also as shown on the picture with the antennascope and grid-dip together.

I use a Johnson SWR bridge also, but find a lower power source is needed to drive it (1 watt). The Micro-Match SWR bridge will handle a KW and, of course, can be left in the line at all times.

So, if you want to have some fun and see this theory really work get yourself a SWR Bridge, or, an antennascope plus a grid dip meter or both. Make yourself some quarter and a half wave feedlines out of the light 53.5 ohm RG58U coax (coax connectors on each end with adapters) and go to it. The lengths are given in *fig. 8*. Remember the Z values read on the anntennascope will be accurate *providing the antenna is resonate at the same frequency that the stubs are cut for and most of all the antennascope is accurately calibrated.* Remember RF is something like water. It tends to seek its own level. There is an explanation for everything it does.

Notes

I highly recommend the use of quarter wave bazookas such as suggested by Collins in their transmitter hand book. This stub makes a balanced feedline out of an unbalanced, creates the opposite reactance of which the antenna does making the bandwidth of the antenna very broad and presents a high impedance to any RF preventing it from flowback down the shield and radiating vertically, (one cause of TVI).

The antennas I recommend are Inverted Vee's for the low frequencies.

Since lowering the ends of a dipole raises the resonate frequency I have found the factor 475 to be closer than 468 for determining the resonate frequency. (Angle of droop about 45 degrees).

One pole can be used to support a 75 and 40 meter inverted vee. It is advisable to run the two antennas at right angles for min. effect on each other and both can be connected to the same feedline.

The factor to use when calculating the length of a half wave 3 wire dipole or a folded tripole is $\frac{430}{\text{Freq}}$ not 468 because of the added capacity to ground, etc.

Incidentally a 40 meter dipole works very well on 15 meters despite a SWR of 2::1 and sometimes higher. A three wire dipole on 40 meters would lower the SWR in the 15 meter band.

K6RWC, John L. Armstrong helped in preparing this article. ■

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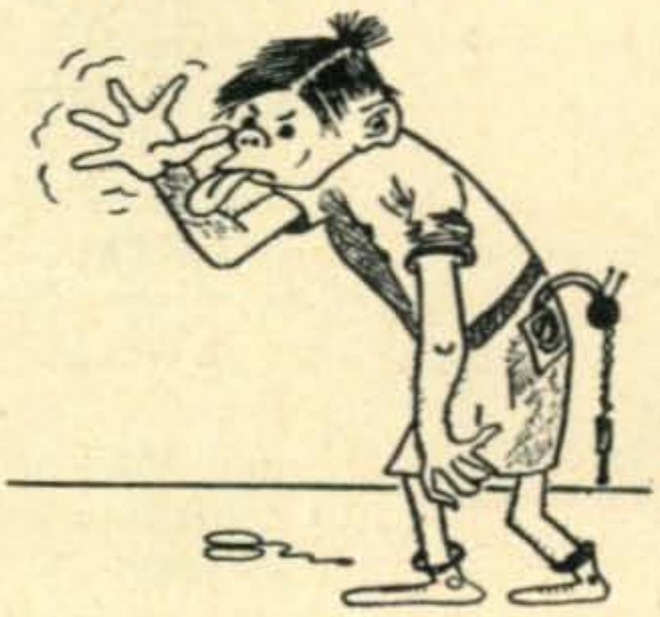
the Novice operator as seen by . . .

his parents

15 meter DX Fone Man

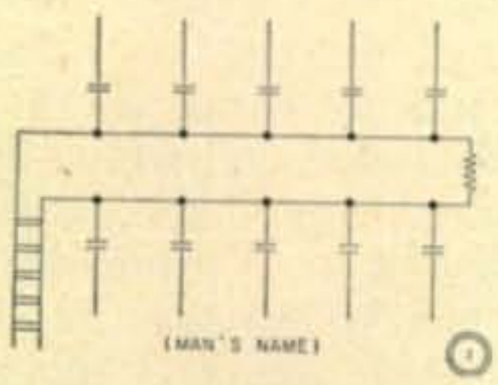


his neighbors

So, You Think You Know Antennas?

CQ adds fuel to the arguments of those Wrong Thinkers who think us unprincipled for baldly stealing some of the best features of *Autocall,* the bulletin of the Washington Mobile Radio Club and four other Capitol area radio clubs.

All you have to do is identify the types of antennas shown. Happy John Kraus to you all. The answers, in case there is one you are not sure of, appear on page 106, so you won't have to bite your fingernails and write fruitless letters to the editor while waiting for us to maybe remember to put them in next month.



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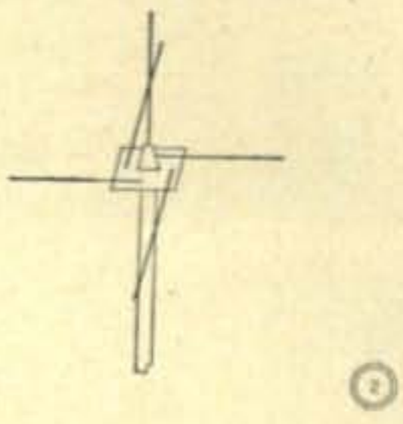

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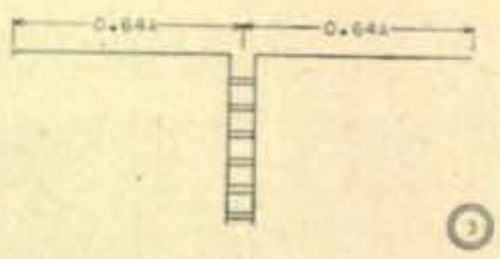

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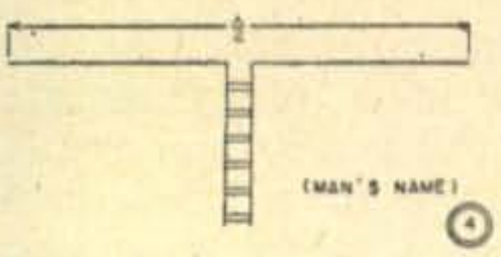

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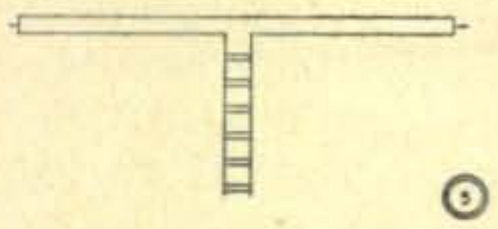

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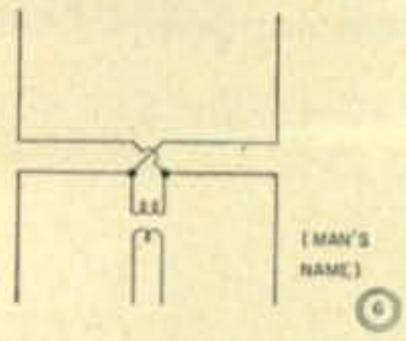

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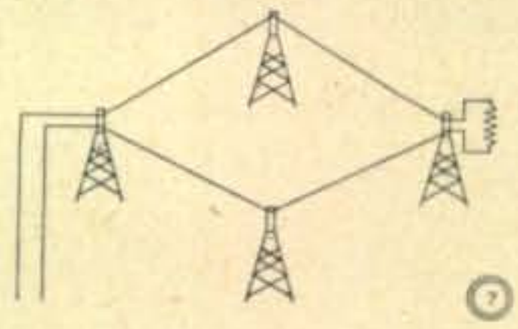

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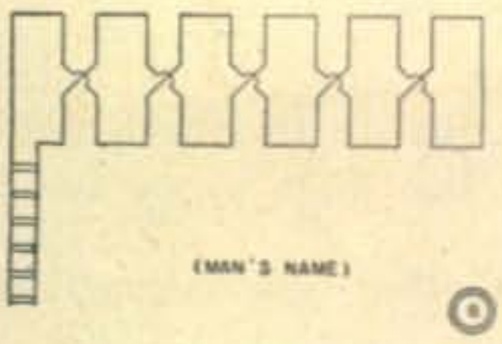

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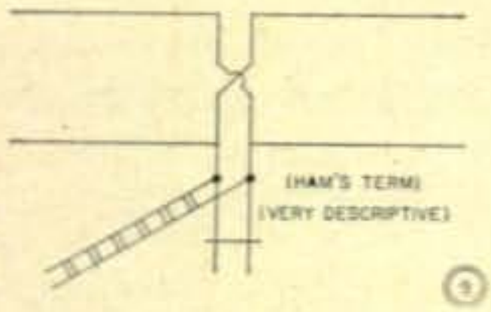

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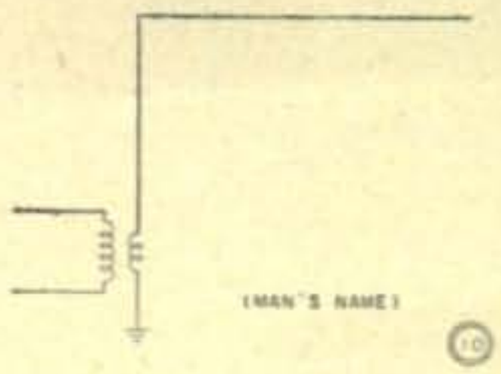

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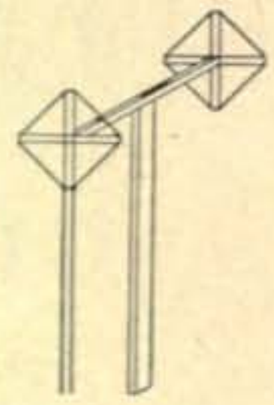

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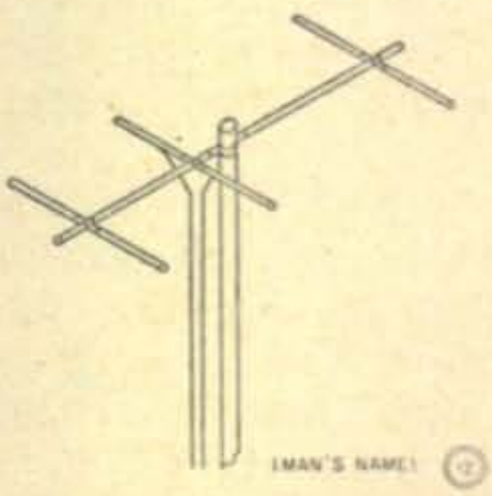

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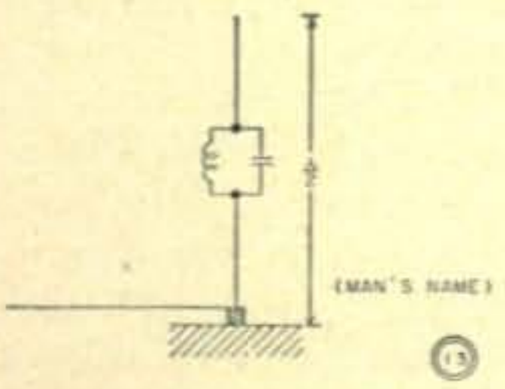

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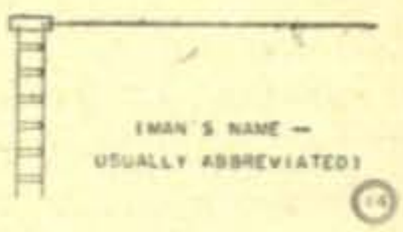

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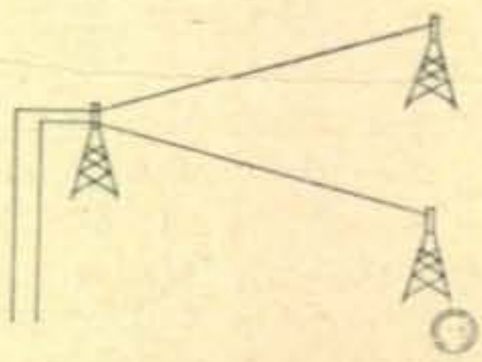

15 .....

High Q on "75"

Gene Nordby, W⌀FQV
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Since the advent of mobile operation on 75 meters, much work has been done and many words have been written on increasing mobile antenna efficiency. It has been generally agreed that the loading coil alone has the greatest influence on whether a major portion of the RF power we take such pains to produce from as low a battery drain as possible is dissipated as heat or is radiated in the form of RF energy from our antenna system.

The efficiency or the "Q" of the coil is known to be a function of many factors, such as: the length to diameter ratio, the size and type of wire used, the amount and type of dielectric in the coil field, the turns spacing, etc. (Terman, Radio Engineers Handbook pg. 74).

For maximum "Q", the length to diameter ratio should be from ½ : 1 to 1 : 1. The coil should be air wound with polystyrene or similar dielectric used as rib spacers. The turns should be spaced the diameter of the wire and the wire should be of sufficient size to handle the fairly large currents associated with shortened ¼ wave verticals.

There are very few commercially built mobile antenna loading coils that meet the above specifications and they are somewhat expensive. Most commercial mobile loading coils are a compromise between Q and band width. However, in the author's mobile installation bandwidth is not a problem since it has a motor driven rotary coil at the base which is used to resonate the antenna when QSY'ing. Therefore a very high Q antenna system was desired, bandwidth being of little consequence.

In an attempt to construct a coil which would fit all of the previously mentioned specifications. it was decided that No. 14 wire would be used and since approximately 80 μh was required, the coil would have to be about 5 inches in diameter and 5 inches long. Fitting the "air wound" specification proved to be the most difficult and much time and effort was expended before arriving at the following coil form.

A 4¾ inch diameter bakelite tube was cut 7 inches long and two ¼ inch thick bakelite discs were made, each having a diameter equal to the inside diameter of the tube. The discs were then placed in each end of the tube and holes were drilled through the tube and into the disc at 90° intervals, around the tube. The holes in the discs were tapped for 6/32 screws and the discs were mounted in the ends of the tube.

This assembly was then placed in a lathe and shallow threads were cut on the tube surface 7 turns (threads) to the inch to be used as a wire winding guide.

The tube and discs were then dissassembled and ½ inch wide strips were cut lengthwise out of the tube at 90° intervals around the tube. Each section of the tube and the corresponding position on the disc were marked so that the tube and discs could later be assembled with the thread on the tube surface having proper continuity.

Notches 3/16 inches wide and 3/16 inches deep were cut at 90° intervals on each disc in the center of the space left by the ½ inch strips which were cut out of the tube. The depth of the notch will depend upon the wall thickness of the tube since when the ⅜ inch by 3/16 inch poly strips are placed in the notch there will be about 1/16 inch poly

projecting from the tube surface after the form is assembled. (The tube in this case had a ⅛ inch wall.)

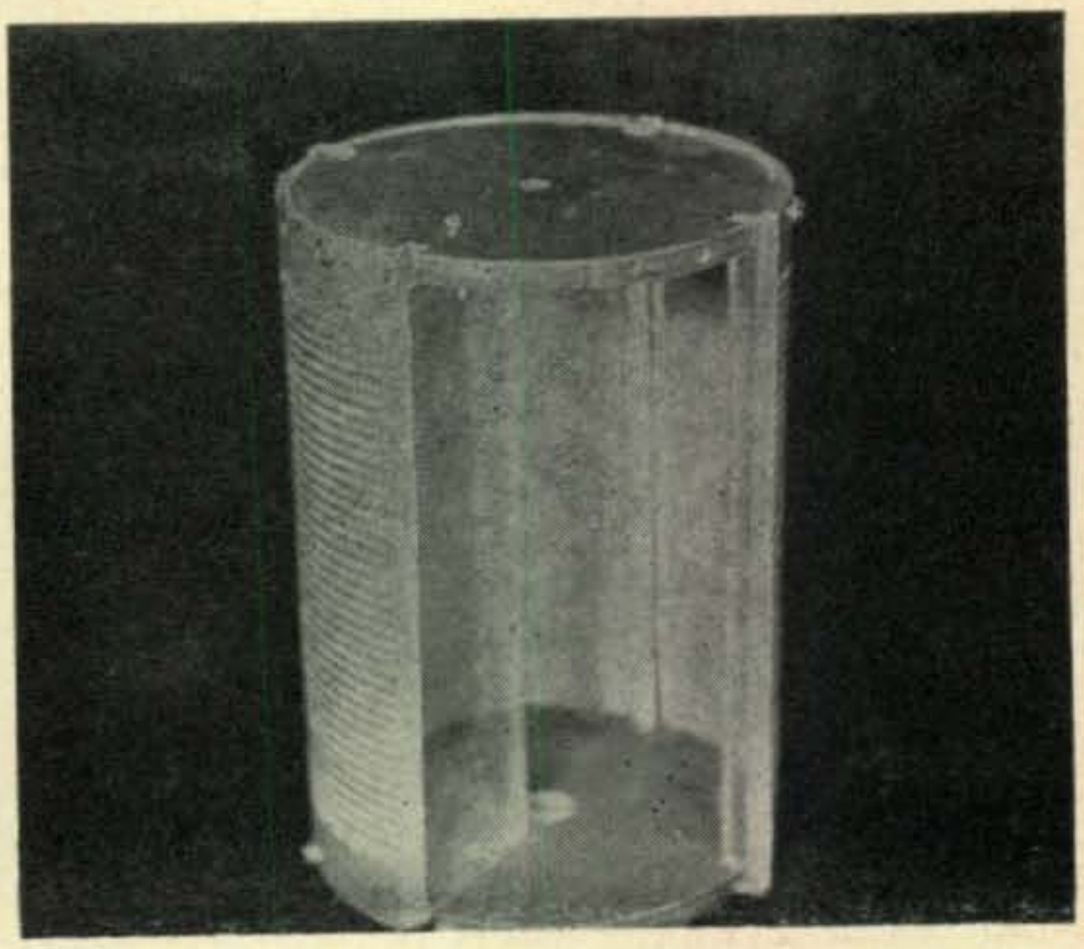
Polystyrene sheet 3/16 inch thick was cut into strips ⅜ inch wide and 7 inches long to be used for the coil rib spacers and the coil mounting bar was cut from ¼ inch poly sheet 6½ inches long and 1⅞ inches wide.

The form was then assembled, the mounting bar being held in place by a screw through each disc and tapped into the mounting bar. The poly ribs were placed in the notches on the discs and the wire end was wrapped around a screw which was tapped into the tube surface at one end.

The wire was heated with a 200 watt soldering iron as winding progressed so as to cause the wire to melt its way into the poly ribs. After the coil is wound the form can immediately be dissassembled since the poly hardens quickly and holds the wire very firmly.

A small amount of poly coil dope was then painted over the wire at the ribs to fill the gaps in the poly made by the hot wire. Holes were drilled in the edge of the mounting bar and the core was tapped for the screws used to hold the mounting bar in place (see photograph) The core used in this case was that of a Master Mobile 75 meter coil, however any 1 inch diameter piece of bakelite rod 7 or 8 inches long with brass inserts at each end tapped for a ⅜ x 24 thread will do. A liberal amount of good cement was placed around the junction of the poly mounting bar and the core. Then the entire assembly was sprayed generously with an acrylic.

The coil is mounted in the antenna with the mounting bar forward and is pruned in the



Form with one section of the tube removed showing coil mounting bar and ribs in place.

conventional manner with a grid dip meter as a coarse indicator and the fine pruning done by watching the loading on the transmitter final. Caution should be exercised when removing turns so as not to prune too much at a time since there are few total turns and each turn represents a sizeable inductance.

The "Q" of the coil was measured before placing it on the core and was found to be in excess of 600. The exact "Q" could not be obtained since it was so high that reaching out to tune the Boonton "Q" meter affected it considerably. The addition of the core will of course lower this figure somewhat but not appreciably it is believed.

Mechanically the coil is very strong and has withstood all the beating by leaves and twigs given it the past year without so much as bending a turn of wire.

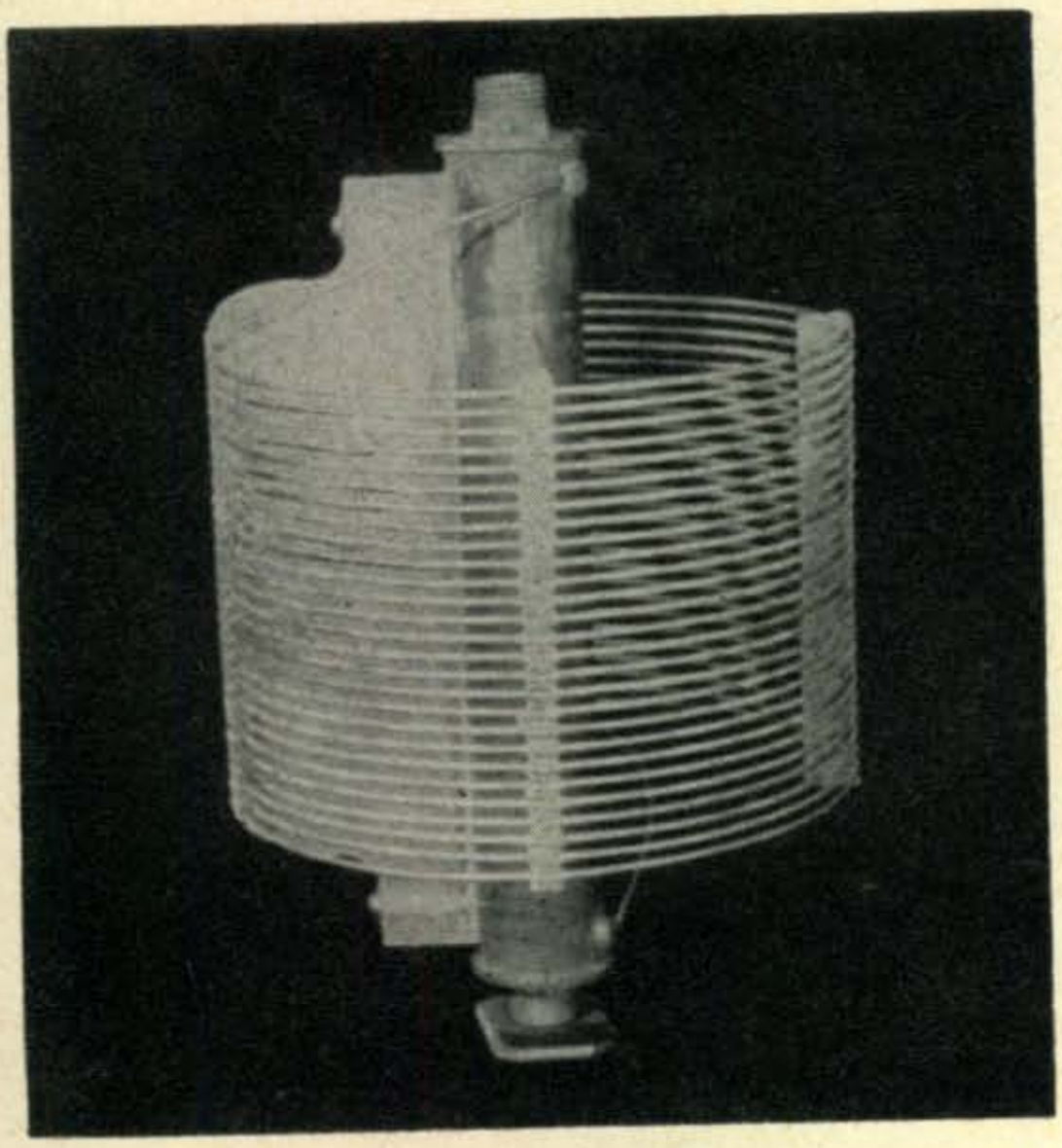
The antenna used is mounted at bumper height without a spring of any kind which has proven to the author's satisfaction to be unnecessary since antennas with and without springs have been used. The whip below the coil is approximately 40 inches long of ⅝ inch solid hard aluminum and that above the coil is a standard tapered steel whip 7 feet long.

Experience has shown that rain or snow has negligible effect on the resonant frequency or loading of the antenna despite the fact that the coil is exposed to the elements.

This coil has worked very well in the author's installation, and several other mobileers in the vicinity who used the form to wind their coils have indicated that the new coil has increased their signal strength appreciably over the various commercial coils they were using.

Get together with a group of mobileers in your community and you'll find that the form can be constructed and several coils wound at a cost of a few quarters apiece which coils will better the performance of commercially built coils costing up to fifteen dollars. ■

Finished coil. Mounting bar should be forward when installed.



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Give it a Brake

"There they go again—I mean the gears in the TV rotor." This type situation can become quite annoying, so I decided to try to do something about stripping gears in the TV rotor, since I was using this type of mechanism to rotate my two element plumber's delight twenty meter beam.

I had a prop pitch motor, of the large variety which weighed sixty pounds and took two and a half minutes to make one rotation, but it was too large and too heavy for my tower. I still wanted to use the TV rotor. The only solution that I could figure out was to make a brake.

the Problem

Being of simple mind, I had to try to figure out something simple. If you study the photographs and the drawings, you will find my answer to the problem. You'll notice that I used two "dogs" to engage the teeth of a case-hardened gear. At first I tried only one dog but found that my engineering principal was only half correct. Rotation of the shaft one way engaged the dog and the shaft would not turn—when the cog wheel was turned toward the pivot of the dog—but when the shaft was turned the other way, I had a perfect ratchet! The easiest solution was to make two dogs, each one being opposite to the other.

Everything was set now except how to engage and disengage the two dogs. A solenoid and a spring were all that were needed for this.

If you are still interested in this project I'll try to give a few pointers, construction and otherwise.

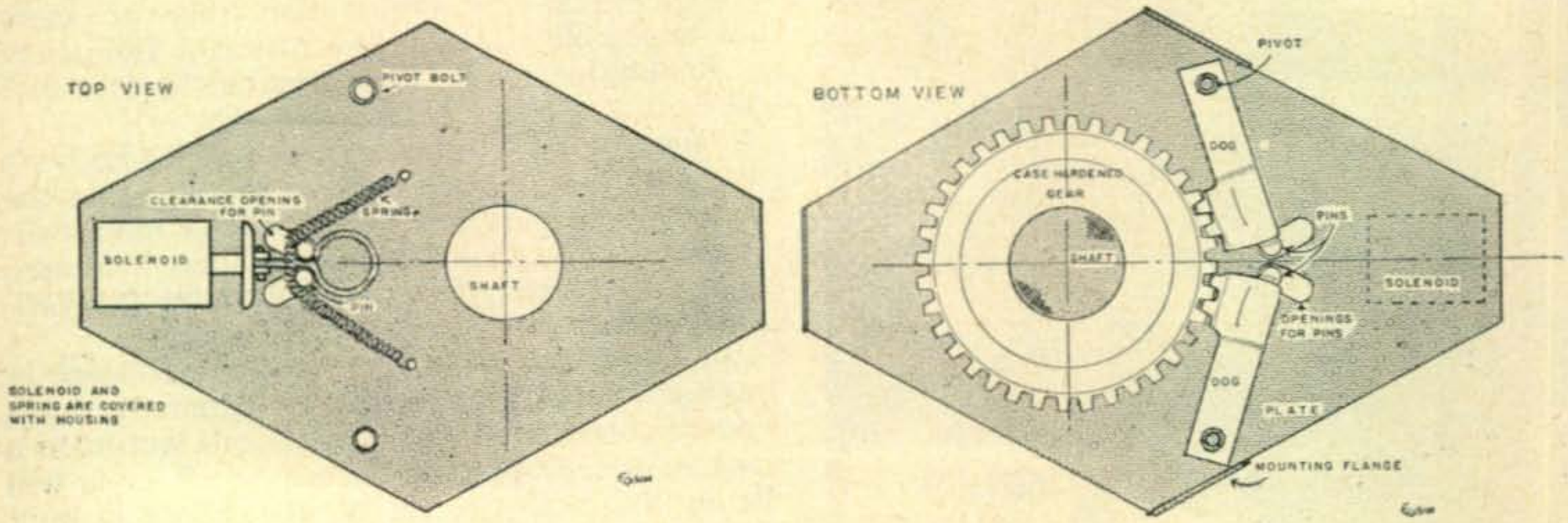
Parts List

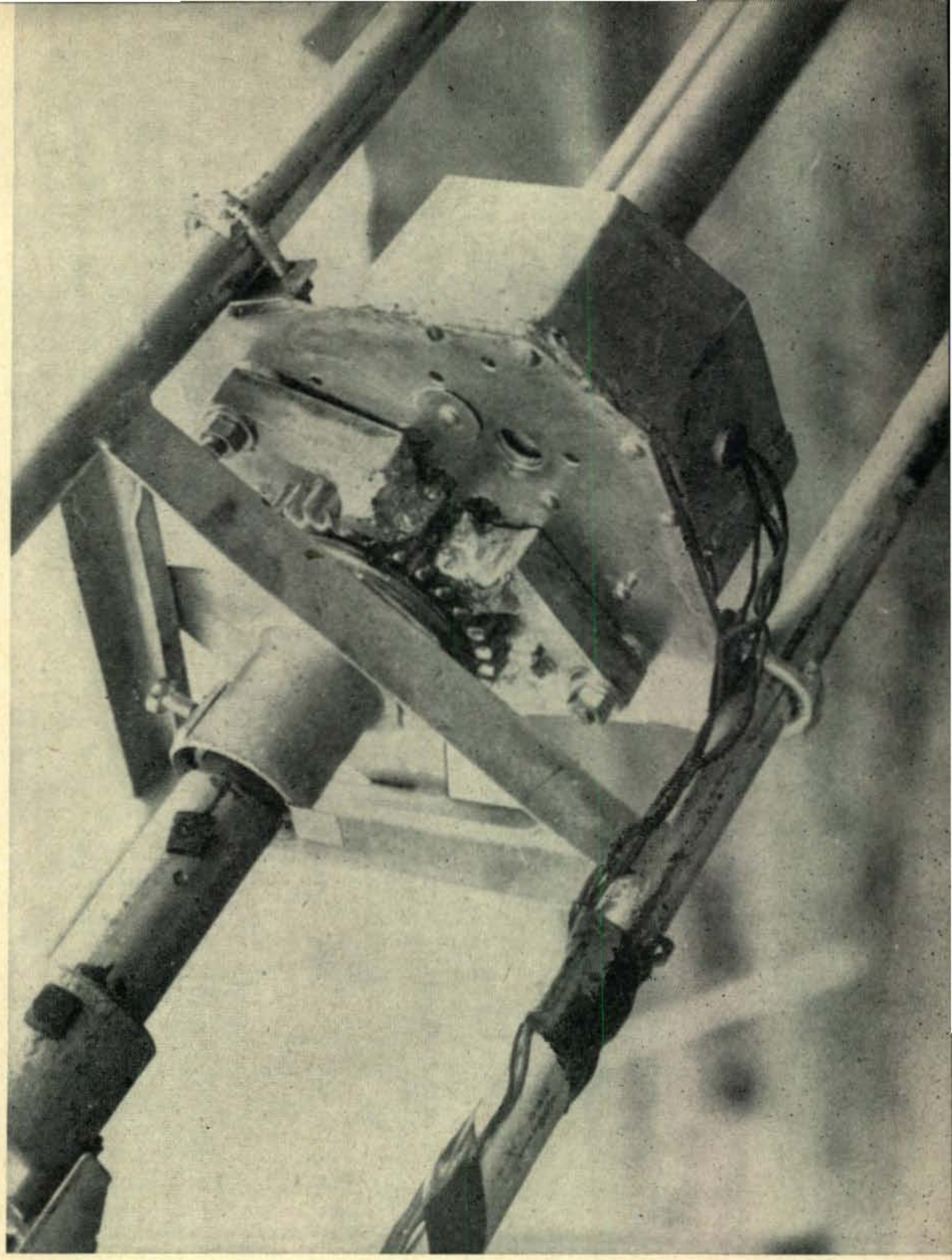
The first thing to do, of course, is to assemble the materials that you'll need. Dress in your oldest clothes, be unshaven, visit your local junk yard. Look for a couple of case-hardened gears from the transmission of an automobile. You don't need one of much over 4 to 5 inches in diameter, and the size of the diameter of the other is not too important as you will only use a few teeth out of the second gear to make the dogs. The gears should mesh though. Also, get a gear that will snugly fit your shaft. I found one that fit on a spline gear, and I was able to press fit the shaft I had to the gear.

While at the junk yard look for a piece of shaft material about 10 to 12 inches long that will fit your beam mast and will also fit the opening in the "brake" gear. Also, you might look for a piece of galvanized iron, or steel from which to cut the supporting plate.

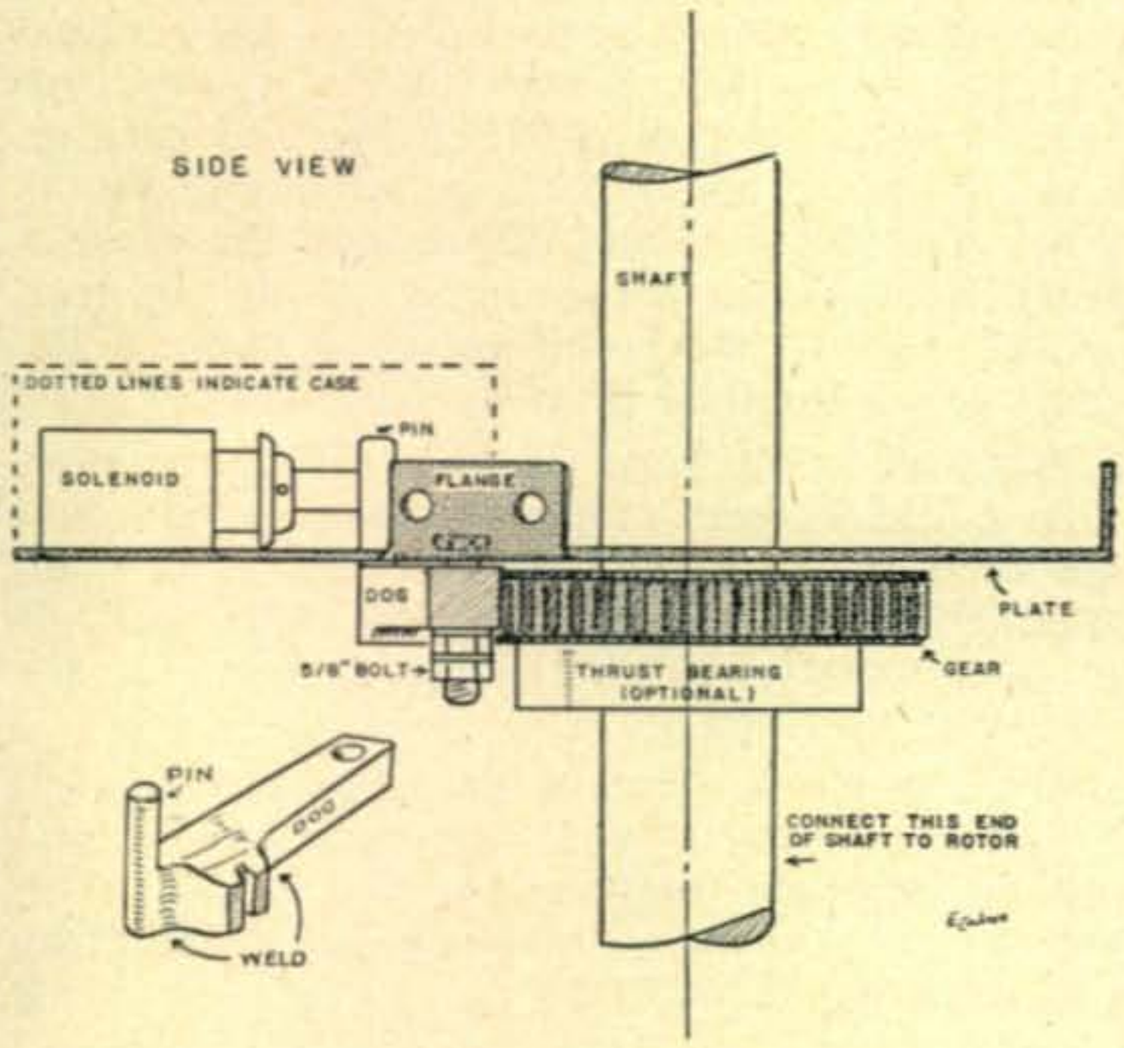
The other materials needed are the solenoid, which can probably be purchased from surplus supplies, a light weight screen door spring and the necessary bolts and U-bolts to assemble the project. Some light weight galvanized iron

The supporting plate can be metal or wood





Underneath view showing the "dogs" engaged in the brake gear. Case on top houses solenoid.



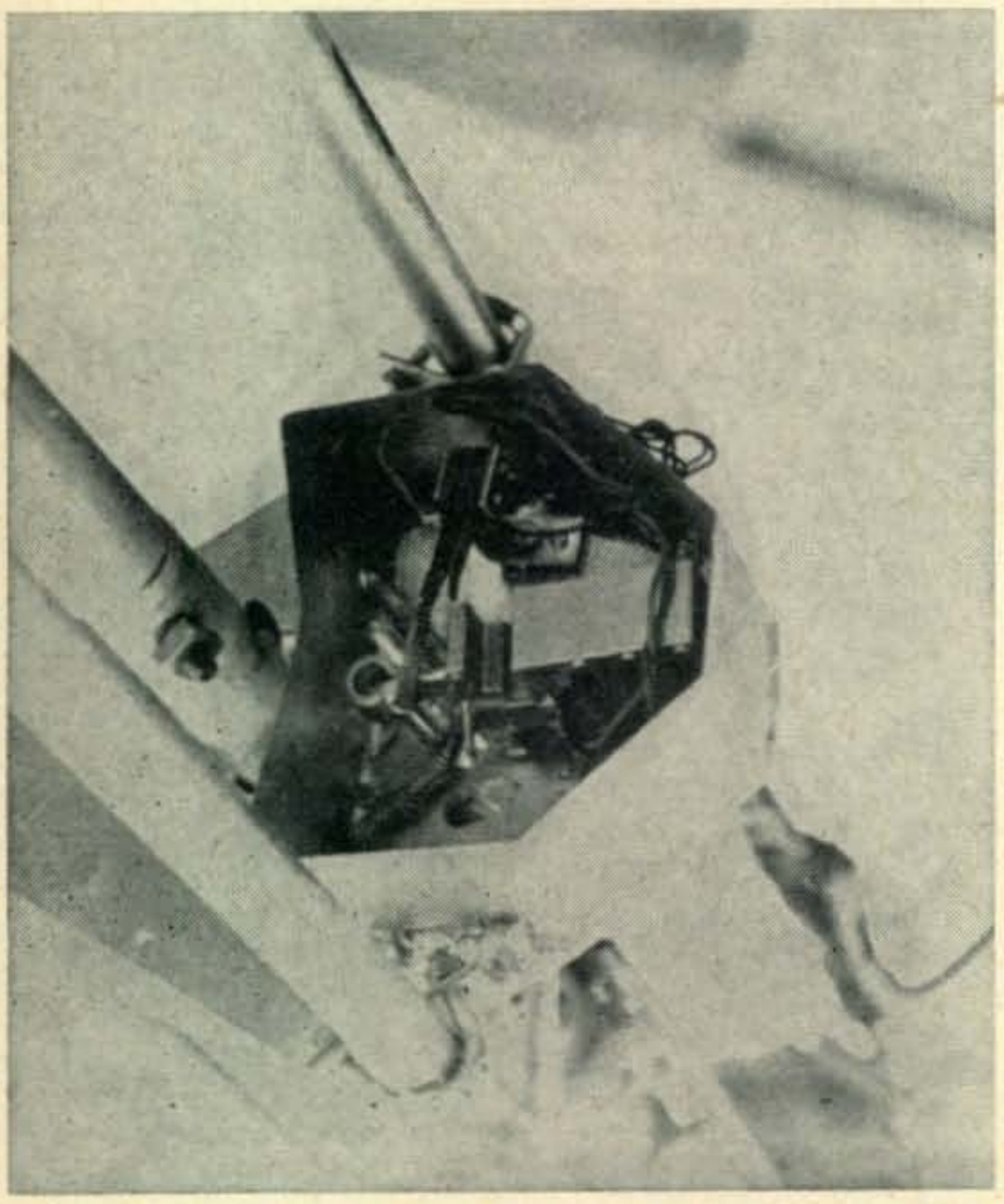
or tinned iron can be used to build the housing for the solenoid.

Different types of towers or supports will determine the shape of the plate for the brake. I suggest that before you cut any of your materials you make a pattern from cardboard of the space in which you have to mount the brake plate. Using this cardboard pattern, arrange the approximate positions of the brake gear, the necessary room for the dogs and the position of the solenoid. If the original cardboard pattern is not correct make a new one that is.

The construction of this brake involves some welding, so it is a good idea to get all the units assembled that need welding and have it all done at one time to save money. For instance, if you use steel for the mounting plate, it is easier to have it cut with an acetylene torch than to try to cut it with a saw. The dogs, consisting of about two or three teeth each, have to be cut with a torch if you have a case

hardened gear. These are the only two cutting jobs of this type. Of course, if you use heavy galvanized iron for the plate, possibly you can cut it with shears.

The welding will consist of the following: weld the previously cut gear teeth, bar stock and rod stock together to form the dogs. Each dog when completed must be the reverse of the other. In case the shaft you have does not fit the gear tight enough to keep from turning, then the gear must be welded to the shaft. This is where the twist and strain occurs so it is imperative that the union between the gear and shaft be made permanent and solid. The only other welding that might occur is if you use a steel plate, and then flanges will have to be welded on the plate. These flanges are drilled for U-bolts and fasten the plate to the tower. The flanges are made from short pieces of angle iron.



A view inside the housing showing the solenoid (120 volt job) and the way the "relay point" switch has been placed for an indicator switch. Spring puts tension on "pins" to engage "dogs" in brake gear.

You can now do the rest of the construction work at home. Drill the hole in the plate where the shaft will go through. Insert the shaft with the brake gear in this hole and determine the position of the dogs. Do the necessary drilling to mount the dogs, and for the openings to clear the "pins." Make sure the teeth of both dogs engage the teeth of the brake gear, so that one dog is not out when the other is in. Position the solenoid so that when it is closed the dog teeth clear the brake gear teeth, and when the solenoid is released the gears will mesh.

Use a light weight screen door spring and place it around the pins in such a position that it exerts a slight pressure on the pins to mesh the gears. You do not need much pressure for this. Experiment with the amount of pressure needed.

Make the "draw bar" for the solenoid. This consists of a piece of strap iron rounded on the end, or made into a "Y" shape and the other end attached to the solenoid. You'll notice that the pins, due to their pivot points, separate as the dogs are disengaged from the brake gear. Therefore, it is necessary to have the end of the draw bar shaped so that it will exert equal pressure on both pins at the same time as the dogs are drawn away from the brake gear.

Test the solenoid action and the spring action, making sure that the dogs are disengaged from the brake gear when the solenoid is *closed,* and engaged when the solenoid is released. Check the spring tension to see that the solenoid closes properly without difficulty.

When the above has been thoroughly tested, make a case or housing for the solenoid to protect it from the weather.

The electrical connections for the solenoid depend upon the type of TV rotor used. The requirements are that the solenoid must be activated at the same time the motors of the TV rotor are started, and the solenoid released when the motors are stopped. In most cases, the TV rotor motors operate through a transformer. By looking in the control box of the rotor you can find the primary or secondary leads from the transformer. Use the leads that are energized by the control switch and use a relay to operate the solenoid. In this manner you can use a relay of correct voltage for the secondary of the transformer, and the relay points to act as a switch for whatever voltage the solenoid uses.

A few refinements may be incorporated in this brake if desired. I put a single pole, double throw switch made of pin ball machine relay points in the solenoid housing, so that when the pins were pulled by the solenoid they would activate the switch. When the gears were engaged one contact would be made and turn on a red light on my control panel in the shack. When the solenoid had disengaged the gears a green light would come on. By using the pins on the dogs to work the switch I knew if the gears were engaged or not.

Another refinement is the thrust bearing. This could be put under the brake gear, and the other side of the bearing rest on a plate attached to the tower. However, the brake is so constructed that the thrust bearing of the TV rotor may be used.

Well, anyhow, here is the germ of the idea. You can do with it what you want, and if you are an engineer maybe you can improve on the design. Anyway, I'm ready for those gusty Colorado winds. ■

Plain Talk About Plain Antennas

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It seems to me that there is no part of amateur radio that is as thoroughly confusing as is the antenna. Actually, the ham brotherhood is not the only group somewhat in the dark for more than one commercial antenna has been twiddled with until it performed with the theoretical analysis not too clear on the details. However, there are a few things that might be said for the benefit of the guy who has unpacked his new receiver and transmitter (who builds anymore?) and now needs to select an antenna to start getting his money's worth out of them. So here is a summary of plain facts about some common antenna systems for those who are not carried away by the prospect of wading through a couple of antenna manuals to find out what type of wire they want to hang up for the neighbors to locate them by.

First of all is my general rule for antennas: "There is no substitute for a piece of wire up in the air." What I am getting at is that loading, tilting, drooping and what-else-can-you-do-to-it do not improve the *antenna* performance. They may make it easier for you to load into the transmitter, but whenever you have to add something to an antenna to make it do something it should do all by itself you are adding losses in one form or another. A half-wave piece of wire with 50 watts to it will outperform anything else that is supposed to *act* like a half-wave piece of wire (but isn't) with 50 watts to it. When you have to load an antenna with an inductor you are taking a loss in the loading element and losses in the antenna wire itself may be higher than when it is self-resonant. With only a little loading, it is usually not serious, but when it amounts to quite a bit (as in the case of mobile whips) you have to be careful.

Antennas do not cause TVI—transmitters do. Antennas make it possible for transmitters to cause TVI but only in case of a semiconducting solder joint or something like that can they do it themselves. When a change of antenna affects your TVI situation, it means you are putting out the harmonics and depending on the antenna system to furnish the selectivity. (This is not counting the case of fundamental overloading of the TV set where a change in antenna orientation can solve the problem.) Usually, the way the antenna does this is to present the wrong termination to the transmission line at the TV frequency and lose all the harmonics in the feedline. If you are trying to end-feed a long wire with a pi-network, you will probably have trouble because in this type of operation the tank output capacity is smaller than normal giving a higher impedance at the output and more harmonic energy. A coax feed may get rid of your TVI because it is very lossy at the TV frequencies it the antenna happens to be the right length. Sometimes use of coax makes it worse. In other words, if the type of antenna makes a difference in your TVI picture, you need to go on back to the transmitter and antenna tuner.

What—you have no antenna tuner? If you don't you are probably radiating more second harmonic than you should. With the usual tank circuit Q of 15 in a single-tuned circuit you can't get the 40 db reduction in second harmonic you should have. According to John Reinartz the best you can do is 38 db with a Q of 20. If you are using balun coils and a low-pass filter, you may be OK with the TV harmonics but your other harmonics may not be down where they should. However, before you cast suspicious eyes at the ole baluns I should say that the type of antenna may do some more attenuating for you. In the case of the folded dipole it will. In the case of the Windom, it may or it may not.

The most important function of the antenna tuner is to give you maximum efficiency by matching the output of the transmitter to the input of the antenna. The losses in the antenna are insignificant when properly tuned up. This function of the antenna tuner has become more important in recent years with the wide use of the pi-network and the use of low-pass filters. When a pi-net is designed, the circuit values are calculated for particular input and output impedances with a given Q. When the frequency is changed all three parts must be changed to keep everything exactly right. Usually the inductance is fixed and the two condensers are varied so a single ham band can be covered with good performance. In some transmitters the input condenser and inductor are ganged together so things are pretty nearly ideal for a given output impedance. For other output impedances things may not be exactly right any more. The impedances may still be matched when it is tuned up but the Q won't be optimum any more. If the Q is too high the tank currents and losses go up and if it is too low selectivity and final efficiency are lost. If a pi-net is designed for 72 ohms with a fixed coil, it will work pretty well from 52 ohms up to about 200 ohms at the design frequency. From there on up the final efficiency suffers. The antenna tuner helps you keep the operating conditions at their best.

And at last we come to the antennas. We won't consider things like the T2FD, directive arrays, multiband antennas with all sorts of

little doo-hickeys hung in them, or other assorted fans, droops or what-not. Only simple antennas are included and this might be a good time to mention the effect of different feeds on a wire. If you have a half-wave in place and get 100 watts *into the wire*, it matters not a burned out 807 how it got there. A coax feed is no better than a single-wire feed or a Windom or a hunk of ten-cent store lamp cord. Remember I am saying we are getting 100 watts *into the wire* in all cases. If you have an antenna several half-waves long, then the point of feed is important and you will get different directivity patterns with different feed. You can find out about this in various books on antennas.

So we will assume we have a half-wave single wire antenna and proceed to talk about them in terms of the more popular types of feed.

Coax center fed dipole—This is a case of an unbalanced line being used to feed a balanced antenna. Therefore there are currents in the coax shield which cause radiation. Because of the balance to unbalanced situation the antenna may be sensitive to position of nearby objects. Losses may be high compared to other feed systems if SWR goes up or weather gets into it. Some objection to weight of coax hanging on wire. Usually easily loaded. May aggravate TVI troubles in some cases.

72 ohm balanced center fed dipole—The main hitch here is the feedline. Twin lead is pretty weather sensitive at this impedance and the old style twisted feedline is just as bad. Coupling efficiently to the feedline at the transmitter may get involved also. Once you get it loaded up, though, it works FB. TVI situation is pretty good too with balanced feedline which is pretty lossy with wrong termination.

Off-center fed antenna—The single wire feed with the ground return was the first version of this but it is not seen much any more. Today's version is the Windom about which many weighty words have been written. It is not a balanced antenna with regard to feed point (although for some strange reason when it is not too high off the ground they act like they are balanced and work very nicely with balun coils) and usually must be fed with a tuner that is not grounded. The proper location of the feed-point seems to vary with height and other things so if you put one up it may work fine and it may not. Many people use them happily (I had one up for over a year) but their efficiency and characteristics seem to vary widely. Measurements I have made on three different installations show that the 300 ohm feedline does not see 300 ohms at the antenna on all bands (or on any band on one of the three) and so feedline losses were higher than they should have been. When they work they are very easy to load. When they don't, put up something else. Their effect on the transmitter's TVI situation seems to vary widely. I have heard of its curing it and I know of cases where it made it much worse.

End-fed wire—This is generally one of the most well-behaved of antennas. The main objection is that it brings the high voltage part of the antenna into the shack and you may wind up with rf on everything in sight. It is a nice multi-band antenna and a half-wave on 80 gives a high impedance feed point on all bands. An antenna tuner is a must. This is a fine deal for people who have the rig upstairs anyhow. The Zepp antenna was all the rage once in the end feed class, but isn't seen much now. TVI can be fierce here if you are not careful since there is no feedline.

Center fed dipole with tuned feeders—This is my favorite antenna. It is a nice all band system with low-loss feeders. It may be a little harder to handle on tuning in some cases, but it is a balanced antenna which is not very sensitive to height and ground conditions since the feed system tunes these variations out as far as the transmitter is concerned. Unbalance in any antenna system will be reflected back to the feedline and may result in feedline radiation. For the most part, all this does is alter the directivity a little. This antenna is not necessarily frequency selective since various combinations of feedline length and antenna length (both electrical length) will give good system efficiency at various frequencies. However, it seems to be good with respect to TVI problems, possibly because you are forced to use a tuner with it.

Folded dipole—This is a good balanced antenna with a matched feedline which does not seem to be particular about what you do to it. They have been draped over housetops, folded up under rugs, collapsed into halos, and laid on the ground. They seem to work fine in any case. It is a one-band antenna except for the 40 meter one which works on 15 meters. Folded dipoles work on the fundamental and odd harmonics, notwithstanding the people who use them on even harmonics where they are using some of their power to heat up the antenna system. The feedline may be any length and balun coils work FB here. It is weather sensitive when made of twin lead and it may or may not help the TVI situation.

From here on out the antenna picture gets fuzzier and branches off into multi-wire folded dipoles, delta matches, Q-bars, double dipoles and a multitude of directional arrays. Many of these are things that people-who-have-time-to-fiddle-with-antennas use and you can do a lot of operating before you need to worry about using them.

One of the things you can hear on the band almost any time is "you are right off the end of my antenna and according to the theory I shouldn't be hearing you." The next remark is sometimes to the effect that he knew all the time that theory only worked for commercial

[*Continued on page 114*]

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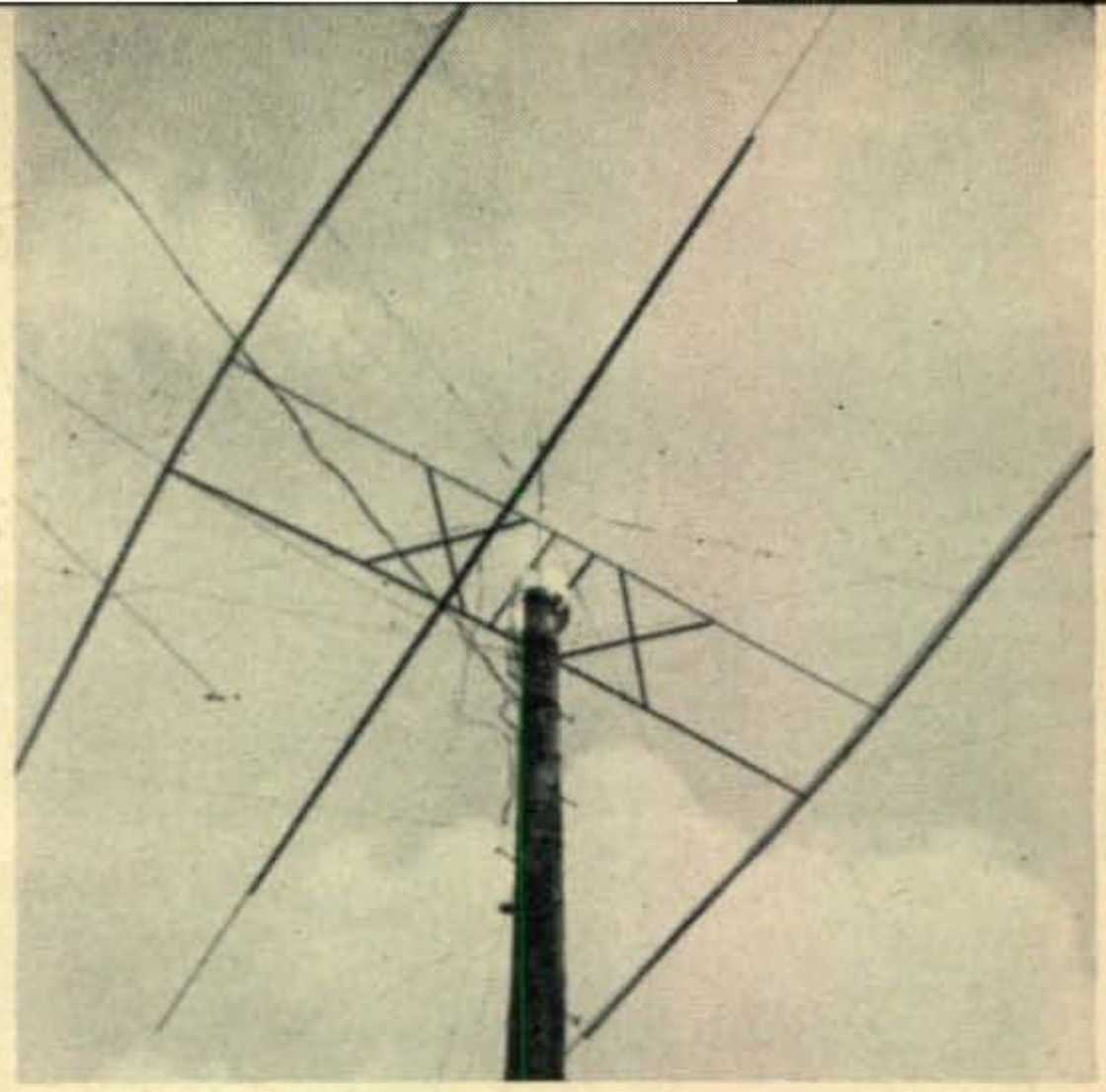
Start of an Antenna Farm



It all started one day about two weeks before the big DX Test. Figuring on a better score if I used a beam, I dug up several bamboo poles, some aluminum foil, and prepared to buy some lumber for the boom. I told my plans to W3JW, who talked me out of building one. He suggested I buy his old one, dirt cheap, make the necessary repairs (replace boom, straighten elements, etc.) and put the thing up.

Well I got the thing fixed and painted. Then I began to think, "How am I going to get that thing up? Where am I going to put the monster? How'm I going to turn it? Will I put it up on the chimney? No, the TV antenna's there. How about the side of the house? No, if we had a good wind it would probably come down, bricks and all. Well, where, then?"

After the first week-end of the test was over I tried to talk the electric company out of a telegraph pole (what's one more pole to a company like that?)

The second week-end passed, with only the promise of a pole. I was notified that a five foot hole would have to be dug to set up a pole, and that *we* would have to dig it. Who did it? you guessed it!

The beam was assembled and hoisted grunt to the tremendous height of four feet, where it was precariously balanced on a clothes pole. Each end of old droopy was supported by step-ladders, the coax was connected and the beam was on the air!!!??

That night I set the alarm for six in the morning and put the clock under the bed so that I would have to fall out to turn it off.

Came the dawn . . . and the alarm. I rolled out and crawled under the bed to turn it off. By that time it had got the whole house up, including the canary and the parakeet, who had both set up an awful fuss. I struggled through all this QRM and put the cans on. I luckily got answers from two VK's, whom I rapidly disposed of (lost, to you) and was forced to give up and go to school (ugh).

For a month and a half there were no new developments on the beam front, and I spent my time on 75 fone. W3TTV knew where he could get me a prop-pitch, which he did. I shelled out and took the thing home, I dropped it on my toe.

Things were really moving now; I came home from school one day and found a 40 foot pole laying across the driveway. Oh well, the pole was more important than getting the car off the street. The crew from the electric company said that the hole would have to go down another foot or two for that pole. Another foot?!! We already had a foot of water down there! Nuts. The best I could do was talk them into lending me the tools to do it with. Without them, I'd have been down there spooning it out with a teaspoon.

By this time, the yard had begun to look like something out of a horror magazine. The monster (beam) rested on the clothes-pole at one side. The well (hole) was half full of water and was surrounded by mounds of clay and stone. The guillotine (seven foot platform built for mounting the beam on the pole) stood about ten feet away looking for all the world as if it were waiting for the hanging. Mother was having fits, and the neighbors were writing threatening letters.

After waiting about a week for some assistance, I went to work and rolled the pole across the yard myself, turning it around so that it lay between the hole and the platform. While waiting for the pole to be lifted onto the platform I got the antenna welded to the prop-pitch. Then the O.M., a school teacher, came through by cornering the track team and getting them to do the heavy work. They threw the pole onto the platform like it was a match stick. By then it was dark, so they said they would come back the next day to put the beam on the pole.

As luck would have it, it rained hard for the next three days. The first good day was Sunday. Where could you get a gang of kids on Sunday?!! The O.M. started out, and in 15 minutes, was back with a baseball team. They picked up the "monster", turned her on end, and slid her onto the pole. We called the O.M.'s golfing partner, who seemed to be the right man to know in the electric company, and told him we were ready for the big heave-ho. We didn't look for much action for a while

[*Continued on page 114*]

the Autenna

Wayne Green, W2NSD
Editor, CQ

Our modern mobile rigs are able to change bands with the snap of a switch, yet most of us have to pull over the side of the road, get out of the car, change taps on the loading coil (or even unscrew the coil and insert another), get back in and start up again. This is so difficult that we usually stay pretty much on one band, enduring all sorts of miseries before changing.

The stories in CQ by those intrepid adventurers who had built (or jerry-rigged) a remote controlled band-hopping antenna have been read with great interest and envy, but the job of making such a dream seemed so formidable that few of us have attempted it.

With this background, naturally we were interested when the ads by Rafred Enterprises broke a few months ago. This was further whetted when I got a chance to see the inside of one at the San Francisco Convention. On my next trip to Los Angeles I made it a point to stop in and see the fellows responsible. Ray Hodges, W6AQP and Fred Schnell, W6OZF have a small shop where they turn out the antennas (all right, Autennas). Over a cup of coffee I got some of the background of the device.

After hearing about all the problems they ran into in trying to design a really good unit, I was sure glad that I had waited for *them* to do all the work. There are hundreds of things that came up that you never would think of. They tried several types of remote tuning systems and finally ended up with a tapped antenna coil, such as most of us are using for multi-band operation, with a motor driven switch to change the bands. To keep the weight low on the antenna they built the motor into a small box at the bottom and ran a pulley up the bottom section to the coil.

Heating by the sun, swinging around in the wind, bumping of trees, all brought out problems in design. The switch section in the coil had to be able to make good contact under all conditions of cold or heat, vibration, wind pressure on the top section, flexure of the coil itself under high speeds, etc.

All these hundreds of obstacles were met and conquered. The unit as now sold operates from 6V or 12V (small resistor added) and uses a meter to indicate the band which has been switched in. An indicator network is built into the base of the Autenna and is so designed that it does not affect the loading. The meter is calibrated for each of the taps on the coil so you can tell quickly what band is switched in. The whole works takes only minutes to install. I put it in my car in less than a half hour. I found that the control box with the meter and reversible switch just fit fine in a corner of the glove compartment. Twelve volts was robbed from the back of the cigarette lighter, under dash.

The taps on the Autenna are designed to match the normal car installation with a 60" top whip. In most installations these will be just about right, but they can be moved around by the perfectionist for on-the-nose loading. Taps are provided for 28-21-14-7-4.0-3.9-3.8 mc. The need for three taps on 75 is obvious to anyone who has mobiled on that band.

An indicator network is built into the base of the Antenna and so designed that it does not affect the loading. The meter is calibrated for each of the taps on the coil so you can tell quickly what band is switched in.

Considering the amount of engineering that went into the design of this unit and the care with which it has been machined the price of $69.95 seems to be amazingly low.

The Autenna works out just fine on all bands. I had to move a couple of the taps to get it to tune perfectly since I had it mounted in an unusual position (see photo). The signal reports are excellent and little seems to have been sacrificed in the way of performance to bring us this all band remote control feature. ■

a review of

Antenna Rotators

(one good turn deserves another)

Michael Hunt, WØYMW
416 E. Lee St.
Moberly, Mo.

Are you in the market for a rotator to go with that new beam or TV antenna? Or are you lucky enough to have a rotator around the shack and just aren't sure how to install it? Well, whether you are looking for one or are trying to install one, read this article first.

Let us first consider the guy who is in the market for a rotator. One good possibility is to check the local radio and television stores, they sometimes get good used rotators in trade which you can pick up for almost nothing. I once got a $40.00 rotator for $12.50, and it has proven to be twelve and a half bucks well spent.

All of this time we have been figuring on a cheap means of antenna rotating. So let's change a bit and consider the guy who can afford to coin the dough a bit in buying a rotator, and since he can be choosy, we will be too.

Let's say that you have a single 2 or 3 element, 10 meter beam. The best advice is just to get an antenna rotator of almost any make, as most all of them will support, start, turn and stop a beam or TV antenna of about 20 pounds. If you have something a bit heavier, say a 20 meter beam, then the problem becomes a bit more complicated.

The first thing to look for in a rotator which is to be used with an ordinary amateur or TV array of any size is a thrust bearing. Without this the rotator will probably break down under the strain.

In choosing the rotator be sure to figure out what the load capacity is, and then don't exceed it. As far as I am concerned I never put more than ¾ of the total load capacity on a rotator.

If you simply must put one or two hundred pounds of load on a rotator, then I would suggest using a rotator which is designed for amateur use, or a TV antenna rotator using a roto-brake (sold by *World Radio Laboratories*). This latter item will convert any TV rotator into a class A-1 heavy duty rotator. Although it is recommended for use with the CDR model AR-22 antenna rotator, it will function properly with just about any type of antenna rotator.

Referring to rotators designed for amateur use, besides World Radio Labs, there is the Johnson heavy duty rotator and the medium and heavy duty rotators manufactured by Telrex.

Of the above mentioned I imagine that the

TV Rotor used with a brake.

Johnson rotator needs the least introduction. It is an all weather rotator that will support up to 175 pounds under any and almost all conditions. There are two models available. One is equipped with chrome plated slip rings, which match lines between 250 and 800 ohms. This model may be continuously rotated in either direction. The other model moves through only 370 degrees and may be used when coax line is desired.

Out of the Telrex group, consider the heavy duty rotator first, since it is more expensive than their lighter one.

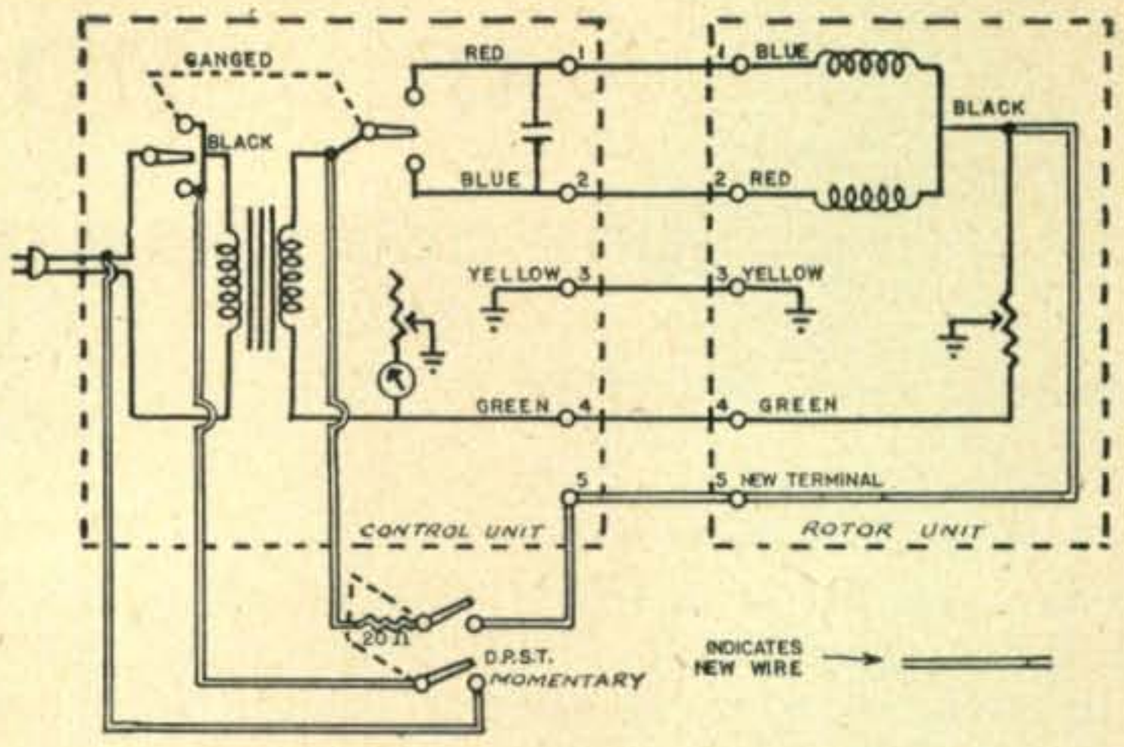
It uses a ¼ hoursepower 1750 rpm single phase 120 volt AC motor, which runs through Boston-gear precision-cut hardened, ground and polished worm gears, and tough heat-treated alloy steel shafts to give 1000 inch pounds of torque, and a .97 rpm swing. Other features are, oil seals at all shaft extensions, and tapered roller bearings which will stand up to a load of better than 800 pounds of downward thrust.

The control box is square and has a sloping face from which the headings are taken from a three-colored compass face, which features degree scales which are accurate to within 6 degrees. This unit also offers single switch control. The control cable used is of the eight conductor kind, the same type as may be used on the Johnson rotator.

The Telrex medium duty rotator earlier mentioned is our next victim. The differences between this rotator and its big brother are principally its size and the motor. It weighs only 9 pounds which as compared to the 50 pound

[*Continued on page 124*]

T-R-4 Rotor Improvements



Circuit diagram—C.D.R. TR-4 rotor with indicator modification.

Earl Cochran, WØUPT
712 N. Tejon Street
Colorado Springs, Colo.

One of the big problems in using the C.D.R. TR-4 TV rotor for ham use is that the indicator only shows the direction of the beam when the motor is active. Since this is an excellent rotator for smaller ham beams it has been used in spite of this difficulty. The newer TR-22 overcomes this drawback in its indicator, but there are a lot of TR-4's still in use.

So, if you have a TR-4, and want to fix the indicator so you can find the direction of the beam without activating the motors of the rotor, here is a simple procedure.

If you study the diagram you'll find that in the original schematic, one side of the secondary of the power transformer goes to the direction switch. According to which way the switch is thrown, one or the other of the two motors will be activated. These wires in the control unit are red and blue covered and go to terminals 1 and 2 of the control box terminal strip. These, of course are joined by the cable to terminals 1 and 2 of the rotor unit, which are red and blue covered wires. The black wire in the rotor unit is common to both motors and joins a resistance unit, which in turn continues via a green coated wire to terminal 4. Terminal 4 of the rotor unit is in turn connected to terminal 4 of the control unit, and here a green covered wire goes to one side of the meter (indicator) and to the other lead of the secondary of the power transformer.

The parts needed to improve the indicator are a double pole single throw momentary switch and a 20 ohm resistor (approximate) of not less than 10 watts. A five wire cable between the control box and rotor should be used, or else you'll have to string one more wire with your four wire cable.

The first step is to remove the housing of the rotor, solder a wire at the junction of the motors to the resistor (this resistor acts as a rheostat and is located at the very top of the mechanism having the contact fastened in the top of the housing). This point is easily located as it is the black wire. Drill a small hole in the terminal strip just large enough to allow the soldered wire to be pushed through the terminal strip. Check your new wire lead to make certain that it will not tangle with any of the mechaniism. Now, reassemble the rotor unit.

A few suggestions before you take the rotor unit apart. First, mark the edge of the housing and the rotor base with a grease pencil so that when you assemble the unit you can line the two parts again as they were originally. The balls of the thrust bearing are in grease and held in place by retainers. These can be knocked out if handled carelessly. Just use a little care and you'll have no trouble.

The wire that you have just pushed through the hole in the terminal strip can be termed terminal 5 (see schematic).

At the control box end install the double pole single throw momentary switch. This can be done on the case or on a separate little panel attached to the case or base of the case. Bring the wire from terminal 5 of the rotor to one side of the DPST switch and on the other contact on the same side of the switch, solder approximately a 20 ohm resistor of not less than 10 watts. From this resistor solder a lead to the secondary side of the transformer which is connected to the direction control switch.

The other side of the DPST momentary switch is connected by leads to the 117 volt line.

The operation is as follows: Upon throwing the DPST switch the 117 eneagizes the transformer, and the other side of the DPST switch closes the secondary of the transformer. The 20 ohm resistor is approximately the same as one of the motors, and the meter (indicator) shows the position of the beam the same as when the motor is energized. There is a possibility that the 20 ohm resistor may not match the resistance of your motor exactly and a slight amount of experimentation might have to be made to determine the resistance.

It is not necessary to use a momentary switch, but it is a safeguard so that you will not leave the switch closed. ■

Wayne Green
Editor, CQ

CoAx Ratiometer

One of the most frustrating things that can happen to a ham is a high standing-wave ratio. Unfortunately, unless we have some instruments to measure the SWR, we usually become aware of the difficulty when the neighbors start beating on the front door, when smoke comes out of the final transmitter coil or when we find that people are just not coming back to our calls.

You can get a pretty good idea of how bad your SWR is by seeing how far away your TVI complaints are, but it is a lot easier (and safer) to get a good SWR meter and make sure that everything is in order before you blast Bilko into a snowdrift for 500 potential enemies.

Hardly a soul is raised these days that doesn't deep down believe that you can get something for nothing. When we build up something new, we are sort of disappointed when we find that it is ordinary. The new transmitter really should work perfectly on the first try. That new antenna should give fabulous reports from all over the world just by hooking it onto the antenna terminals on the rig. It's a pi-net final isn't it? Dreamer.

If you put up a thousand antennas, all with the care of an expert, not one of them will be tuned right. Don't feel bad, we all get a peek behind Santa's beard and find Uncle John there sometime. The SWR meter gives you a means of measuring the degree of the misery and indicates when you've got it licked. You can diddle with the elements of the beam or gnash your teeth at the antenna tuner, and every step of the way you will know how you are *really* doing.

When getting an SWR meter it is a good idea to make sure that you have one that is flexible. It should be one that will handle all the power you may be using (1000 watts) so you won't have to take it out of the line. This also furnishes one of the best possible indicators of any sort of trouble in the entire transmitter-antenna system. If anything goes wrong anywhere in the whole works, you will see it reflected (hi) on the meter.

Universal Service (W8IJ) of Columbus, Ohio, manufactures the CoAx Ratiometer which works on any power from 10 to 1000 watts, operates over the frequency range of 2 to 200 mc, has no balancing circuits to adjust, no resistors in the line to dissipate power, is well constructed and quite reasonably priced. You can get just the CoAx unit and use your own meter for $27.50 or you can go first class, meter and all, for $45.00. This is not a kit, it is a completely constructed piece of precision equipment which is all ready to plug in and go when you get it.

Considering the light construction and delicacy of the final coils in many of the newer commercial rigs it would seem only prudent to safeguard your investment with an SWR meter. ■

V H F

Sam Harris, W1FZJ
P. O. Box 2502, Medfield, Mass.

The short skip openings expected in the spring have been few and far between. For some reason optimum MUF conditions and optimum sporadic E don't seem to occur at the same point on the sunspot cycle. Whatever the reason, this spring has, so far, been disappointing from the short skip point of view. The few openings observed from the East Coast have been short and truly sporadic.

What openings we had, however, still point up the increasing problem of band edge crowding. An encouraging note is the increase in the number of stations who point out that they are tuning from the top end of the band down.

I strongly urge all stations on six meters to tune from the high end down. This is the only operating practice which will increase population of the higher frequencies of the six meter band. It is true that when the band is open for long skip, the lower edge of the band is to be preferred. Sporadic "E" skip, aurora, and normal tropospheric bending show no such preference. Any frequency is a good frequency for these types of propagation. If you don't feel that you want to operate high in the band, the least you can do is to give those bold adventurers who do, a break. *Tune from the high end!* Announce the fact to all and sundry. Make it standard operating procedure for your station. Remember, for every high power station on the low end there are dozens of low power stations higher up. When the band is open, a ten watter in the clear is lots more readable than a kw on the same frequency with two or three strong locals.

Converters for Six Meters

For the past few months we have been testing various commercial converters presently available for use on six meters. Among these was the Tapetone XC-50 and XC-51. The primary difference of these two is in the I.F. output frequency. The XC-50 uses 14 to 18 mc. I.F., while the XC-51 uses 10-14 mc. The XC-50 being recommended for areas where channel 2 interference is encountered, and the XC-51 for channel 4 areas. A rundown on the Tapetones will be presented after we have given them the acid test in the June V.H.F. contest.

In addition to testing converters we have also spent some time in testing various devices purporting to aid in the elimination of channel two interference from our receiver. W1HOY is located about six or seven miles from the local channel two station. The antennas are line of sight. No commercially available converter is usable on six meters when channel two is on. So far, the best filter we have found is a quarter wave coax tank made up from a BC1162A frequency meter. It was necessary to capacity load the coax tank in order to tune the six meter band, and of course the input and output coupling loops had to be changed. The net result was a filter which completely eliminates channel two and has an insertion loss which is below the practical measurement point. (In fact, in most cases the signal to noise is improved due to obtaining a better match between the feedline and the converter.) The same coax tank works equally well on both two meters and 220 mc. Of particular interest is the complete elimination of six meter interference on two meters when using the filter in front of the two meter converter. Using one of these filters on each receiver, it is possible to operate both six and two, using kw transmitters on both bands without causing any crossband interference. (Contest and field day operators please note.)

If any interest in conversion details for the BC1162A is forthcoming, a rundown will be presented.

Two Meters

Just to prove that two meters is still with us the following from Walt (W2CXY).

"Just to let you know that W4EQM finally made it here during the Lyrids, 4/20/57 A.M. on his birthday! Also WØIPS, 5/4/57, Aquarids. Average S2 but two to three minute peaks of S8-9! I lay claim to having on tape the loudest cw signal over 1000 mile range. We didn't just have a contact, we had a QSO. QSO'd him 0600-0615. Had sked to 0700 but didn't need it. No dice on W4LNG in Georgia. W4EQM reports hearing me but I didn't hear W4LNG and assume he didn't hear me. (Still waiting to hear.) Still waiting to hear from you re: Circular Polarization." (Walt goes on to threaten bodily injury if I don't write.)

High Power for 144 mc Denied

The following excerpt from an FCC release dated April 29, 1957 is self explanatory: (and a crying shame too).

"1. The Commission has before it for consideration a petition filed by Thomas P. Leary requesting amendment of Section 12.131 of

Part 12 of the Commission's Rules to raise from 1 kw to 5 kw the maximum allowable power input which may be used, under certain conditions, by licensed amateur radio stations operating in the 144-148 Mc band. The purpose of the proposed amendment is intended to enable amateur licensees to experiment in the field of scatter propagation.

"2. Neither the petition under consideration nor any other data available to the Commission indicates that it would be in the public interest to increase the maximum allowable power input at this time. While recognizing that experiments of amateur radio station licensees have resulted in valuable contributions to the science of telecommunications, the Commission believes that the requested amendment would not significantly increase the potential for experimentation in the field of scatter propagation.

"3. Therefore, IT IS ORDERED, This 24th day of April 1957, that the above specified petition of Thomas P. Leary is hereby DENIED.

FEDERAL COMMUNICATIONS COMMISSION"

and thus ends, for the present at least, our dream of high power scatter links on two meters.

Do It Yourself

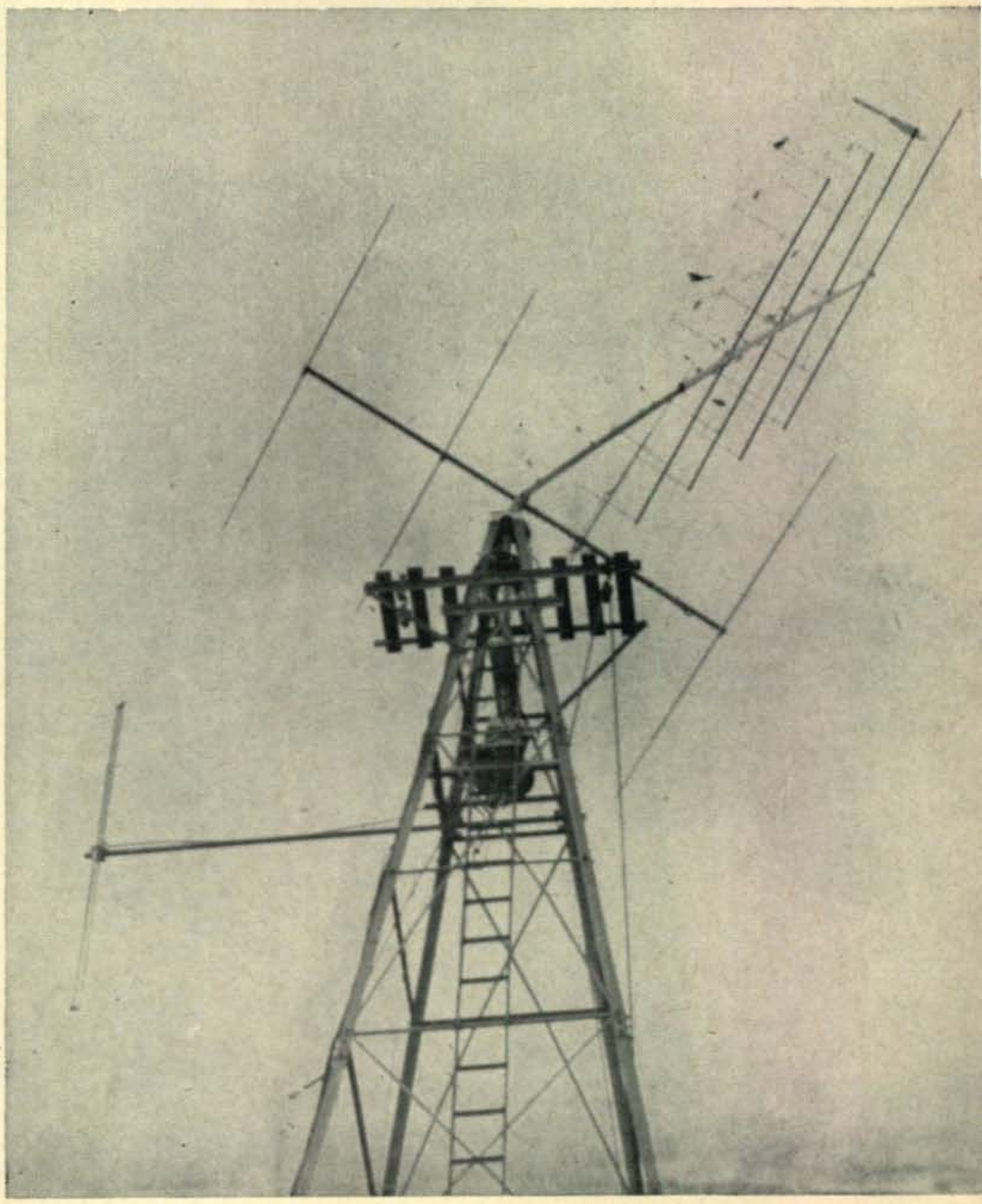
The letter and diagram (May 1957 VHF column) describing W2SHU's six meter converter really started something. We have received literally dozens of requests for the layout which Amp mentioned as being available. *Please note!* Published herewith is the chassis layout for the converter.

Among the other things people want to know: Where do you get 404A's? Who told me that hams don't build their own equipment? Why don't we publish diagrams using ordinary tubes?

Gee fellows, I didn't know you cared. I don't know where you get 404-A's. Anyone want to get rid of some? If so drop me a line and say how many and how much. While we are on the subject, the latest price on good 416B's is quoted $15.00 the each. (And worth it too.)

Masers and Such

Just because I didn't mention them last month is no reason to breathe a sigh of relief. What have you been doing? So far we have received an offer from old Bill Dean (K2PNF, another good Ohio boy) to write a good run down for us. (Hurry up Bill, we're waiting on you.)



Leroy May (W5AJG) had a little wind trouble down there in Texas. Careful examination of photo reveals that the two meter antenna, at least, is for the birds.

Brattleboro, Vermont That long looked-for state is on the map after all, and we have proof from Smitty (W1FMK) who has encouraging news for everyone looking for Vermont.

"We have now about twelve stations up here on six meters, not all have beams at the present writing but will soon have them up. To try to get the guys and gals to head their beams this way, we have had a certificate made up. We meet every evening at 1800 and every Sunday morning at 0900 on 50.250. We will award the certificate to anyone working three of these stations and QSLing with them. The cards do not have to be mailed here, only a request for the Certificate sent to me, W1FMK, 79 Maple Street, Brattleboro, Vermont.

"I'll be on 220 for Vermont in a couple of weeks." *Be looking for you on 220, Smitty, and am very happy to be the proud owner of Certificate No. 4.—Signed—Helen.*

Barre, Vermont George (W1MMN) is just trying to make us eat our words, so he's sending information too:

"I just received confirmation from W9KLR on our May 1-6 meteor scatter skeds on two meters. May 3rd turned out to be the best day according to our logs. My XYL, W1OAK, was responsible for the good work as I had to work that day. *Can always depend on the XYL's can't we George.* I'm running a hundred watts to a thirty element beam (six five's) and receive with a 417A-Tecraft-S20R/QF-1. I own a 416B and some 4-65A tubes, so may use them some day. My ground elevation is 1600 feet and the antenna is sixty-five feet high. I now have fifteen states worked on 144 mc, the only band I work. My normal operating frequency is 144.295 but have a heap of crystals. Next best is 144.021 but QRM is bad." *More than happy to listen to your scribble George and even happier to get the layout and just what you've been doing recently.*

Six Meter Club

An announcement of another Six Meter Club came to us in the mail and another certificate is available to those who would like it.

"The 6 Meter Club of Dallas was officially organized on March 22, 1957, with twenty-five members.

"We propose to make other stations outside of Dallas County, Texas, Honorary Members (all privileges, but no dues), if they work ten of our members. All we need is a list showing the station call letters, time and date worked. No QSL's required. Send information to Rosemarie Randolph, Secretary, K5BDL, 6209 Menger, Dallas 27, Texas.

"New stations are coming on six almost every day, but still plenty of room. We hope our club can stimulate more activity on six and the other VHF bands." *I'm sure it will, and best of luck to the six meter gang in Texas.*

Needham, Mass. From our neighboring town and our neighbor Walt (W1LQU) we receive news of a new net.

"There will be a Flying Saucer Net every Thursday night at 2030 on 50.7 in Massachusetts. Everyone is welcome to the net." *Thanks for the info Walt, guess we live too close to get it on the air.*

Muskegon, Michigan Herb Kahlo (K8CIC) sends a list of recent activity:

"On May 1st I worked CO2XZ and a couple of 4's. May 2 I worked eleven Texas stations, and Texas was coming in here from 1115 until 1430. May 4th, worked VE1EF, W1LSN, W1EZZ and W1QCC/VE1." *Congratulations, Herb. Looks like you've been a very busy boy, and that you're well on your way to your Dallas certificate.*

Meriden, Connecticut Little heard from Connecticut comes through this month by way of Doug Blakeslee (W1KLK).

"Had lots of fun in the contest, ran up a much better score than I expected to. I am just finishing my first year in High School. Lots of local activity on two, there is always someone with whom to shoot the breeze. As far as six goes, in Meriden it just isn't. During our last vacation W1JGS and I got together some six meter gear but so far the crystal converter doesn't work. May is the end of my Novice so have to move down to the low end of the band out of no DX man's land. Hi!" *Thanks for the report Doug, hope we see you soon on the band.*

Fort Bliss, Texas Kenneth Martin (forgot to sign his call) sez:

"Just a short line to let you know about the VHF bands here in El Paso. There are seven hams on six meters, two on two meters and two on 420 mc. I have heard good signals from K6EPT, K6QPW and K6GWI. I also heard some South Americans but they were very weak.

"I use a Gonset Communicator and a Gonset beam. I'll be in South Dakota around May 20th." (sorry O.M., your letter was too late for that)

Two Meter Mobile antenna designed by Roy Rogers (KN2TNU). Material is stainless steel chimney strap. Want to know more? Write.

Brooklyn, New York Brooklyn New York makes its appearance via Frank Bremer (K2KRC).

"I've had three letters requesting information on the Viking Two Meter VFO and how to put it on six. Thought you might like to put the instructions in the column.

"All that has to be done is this: adjust the VFO as called for in the instruction sheet on two meters. You will find that C2 capacitor is about one third open. Now turn on your six meter receiver. With the VFO dial set to 144 open C2 until you hear the beat-note in the receiver. The capacitor should now be about three quarters open. You can use the VFO with the Viking 6N2 if you put two marks on the back of the VFO above the shaft of C2 and use the receiver to calibrate the VFO as you go from one band to the other.

"Six meters is pretty active here in Brooklyn now, yesterday twenty-four stations checked into the Six Meter Races Net. There is always somebody on the air

now, not like it was a year ago." *Guess activity on six has picked up all over the country Frank, sure has in this direction. Thanks for the instructions, they'll be greatly appreciated.*

Dallas, Texas From our old stand-by Leroy (W5AJG) some more two meter news:

"We had us a pretty nice opening down here on two meters on the 23rd of April and lasting into the morning of the 24th. It has been a long time since two has been of much account in these parts and the opening was sure welcome. Expect it has been well over a year for anything at all.

K2KRC and visitor DL1FM. (Obviously a candid photo.)

"About 2100 CST the W/Os starting dropping in down in South Texas, such as Austin, Hamilton, Etc. They were very weak here in Dallas at this time. After a while however, about 2200, they started fading down there and began building up in the Dallas area. They stayed in very strong until at least 0200 the next morning when everybody was gone.

"Here at W5AJG we worked eleven different stations, all around the Kansas state area. They were as follows: WØBYC, WØOZK, WØCDH, WØZJB, WØQDH, WØJAS, WØSKN, WØETX, WØBUH, WØUFP and KUØGIA.

"About twelve, midnight, after most of the stations were gone to bed, Vince, WØZJB, rag-chewed for over two hours. *Just like Vince.*

"During that time, I transmitted on six meters also and Vince got a good signal off that band. I understand it was open that night but did not spend time with it as two meters was more interesting to me at this stage. No other stations were on six at the time. Vince claims it was a form of ground wave such as two and not Es. It is not too common to have six from Kansas to Dallas, although have done it many times. Normally skip is a little longer than that.

"One interesting experiment we made. I had one of the boys at Channel 4 TV station get on with a communicator. The match is not good but I wanted to try the tall, 1500 foot tower out, *who wouldn't*, under conditions of a band opening, something that had not been done before. The result seemed to prove that height does not enhance materially the signal under skip conditions such as we were having. With my home rig, 600 watts and O32 element colinear, WØ—pegged me on his NC300 at 30 to 40 over nine. With my communicator on the tall tower the signal was about S8.

"Previous tests on the Channel 4 antenna showed much better coverage on pure ground wave with a communicator than I could do at home. I speak of distances out to about three hundred miles or so. However, I have always thought under real strong band opening conditions on two that the height was not too important. The above seems to prove that such is the case. At any rate I sure hope we get some more of this stuff this summer.

"As you have read, Texas weather conditions have been lousy for the last seven or eight weeks and is still bad. Am continuing the meteor tests May 1—6 and will let you know if any success, but the QRN hasn't let up very much during the above weeks. The night of the opening was the exception. It suddenly cleared between tornados and we had the opening. Next day? RAIN, TORNADO and FLOODS." *Thanks very much for a most interesting letter, Leroy. I know that everyone will be as interested as we were at this QTH.*

Baton Rouge, Louisiana The deep south has emerged in the person of John White (W5UKQ):

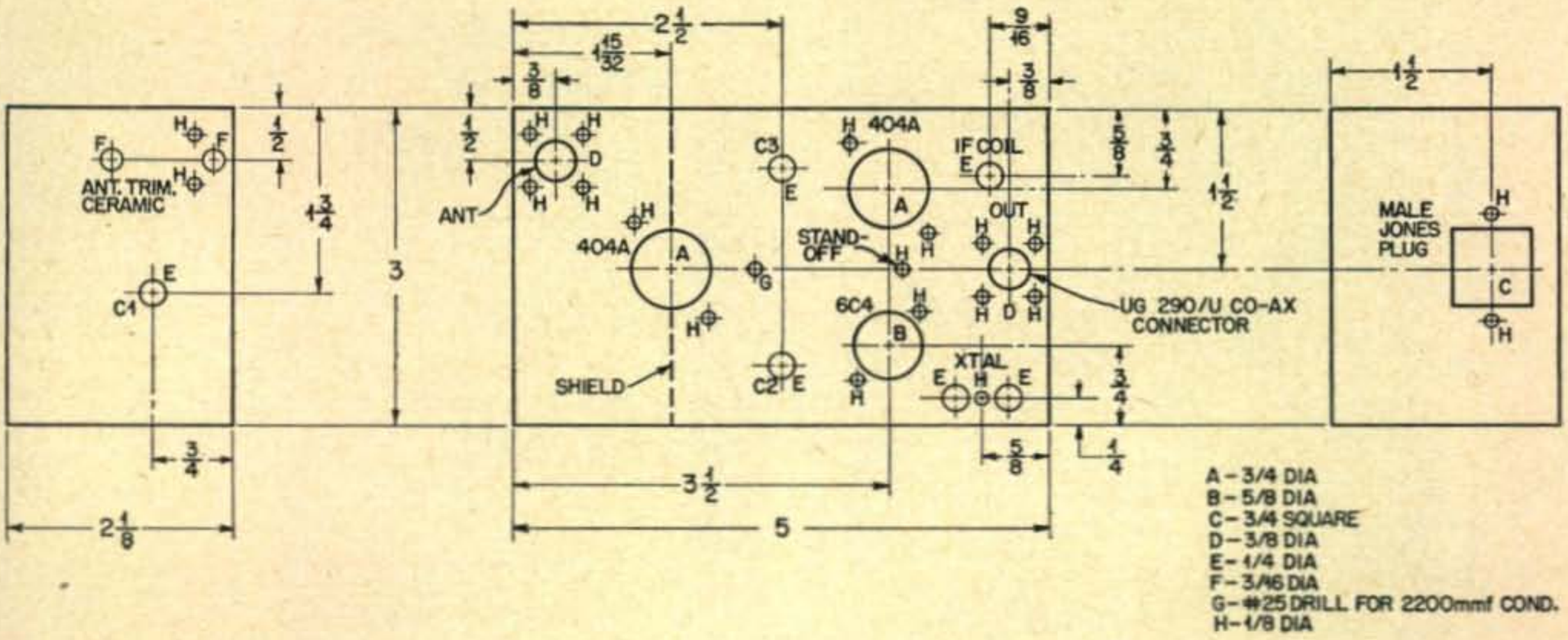
"We have a bunch on six here in Baton Rouge in spite of Channel 2. I had a short burst with W3EBH but not long enough to call a contact. The Gonset here just can't tell hams from TV. Is there any way to keep the cross talk down on 'em and also what can be done about Channel 2 on the receiving end. Any ideas will be looked into very thoroughly. Otherwise we are having great fun here with mobil—. The Gonset in the car will work about twenty-five miles to a fixed station and two mobiles will work about ten miles.

"We are right at the edge of operation Smoke-Puff and I am dropping W6QYT a card for skeds. *GOOD!*

"Soon we will have a 416B on two and a better converter on six and will be able to hear what we can work (I hope).

"A list of the boys on six here: W5ZSP, Frank; W5UKQ, John; K5AZT, Francis; W4WQR/mobile 5, George; W4ZXS, Cal; W5HEZ, Jack; and K5BRM, Bruce." *O.K. fellows, come along with your helpful hints, and send them to John. Have you tried a coax filter, John?*

At last! the layout for Amp's converter.



Oklahoma City, Oklahoma Oklahoma comes through for one of its occasional appearances in the column; thanks to Jim Kyle (K5JKX). "This is the report on Oklahoma City area activity. About eighteen to twenty stations are on 50 mc here, with a number on 144 as well, but my Tech license doesn't get me two meters, so about that I can't report.

"I've been on the air since March 4th, using a DX-35 converted as per January 'CQ' directions. Worked total of six states (including Oklahoma) in that time, with only two band openings. They were the nights of April 22nd and 23rd. Contacted W4IKK, W4TDW, W8FNE and W4NWB among others. These openings, we feel here, were temperature inversion effects, since there was a heavy stationary front in the area at that time, and it was a pipeline to the southeast. However, W4IKK was working portable with only six watts and came in R5-S3 here. He tells me I was 5 by 9 there.

"Antenna here is a wild homebrew of extra wide-spaced beam, three elements in all. Along with everything else, I'll add in the fact that nearly all stations in Oklahtoma City area is 50.1mc; both myself and W5INQ are usually monitoring that frequency all day.

"Oddly enough, trophospheric scatter doesn't seem to work out here. It's difficult to make reliable contacts from my QTH to Norman, Oklahoma, twenty miles south, and I have yet to hear anyone from either Tulsa, 250 miles northeast, or Dallas, 210 miles away. However, the two-meter boys tell me they are making reliable contacts all over the state at the low end of their band." *Fine business Jim, lots of news, information and everything else it takes to make it interesting and informative reading.*

Grand Haven, Michigan Joe Kolenic (W8ESZ) reports his DX to date.

"May 1st, 1957 at 1127 and again at 1148, we worked CO2XZ of Havana, Cuba, and also worked W2CCA our thirty-fourth state on six meters, also W4VOZ. We are using an 829B, driving it with a 2E26." *Thanks Joe, nice to hear that you're doing so well. We'll be looking for you.*

Picotu, Nova Scotia From way up there Russ Merry (W1QCC/VE1) comments:

"Have you been looking for me on two at sked time: If so I'm sorry, 'cause I don't think you can hear me from up here. *Who sez?*

"I've been transferred up here and am now working for Eastern Tel. & Tel. Co., they are a branch of A T. & T. Co., the Special Products Division. I'm in charge of five Micro-wave Stations, from the New Brunswick border to Cape Breton Is. These stations are in the overseas cable network.

"I've been granted my license here in Canada, I'm now W1QCC/VE1. I haven't been on the air very much, as I've been so very busy trying to get my new job straightened out. *No excuse.* In fact about the 16th of january I was snowbound on one of the hilltops for a few days. We did have fun? Drifts eight feet deep." *Good luck Russ, we're still looking for you on two meters.*

Elmendorf, Alaska Jerry Ward (KL7TOB ex WØTOB) a correspondent from the frozen wastes emits with:

"A few words to let you know the six meter activity here in the land of the frozen North has increased recently with two more stations on the air. This, making a total of four in the Anchorage area at the present time. *That's just about twice as many as we expected, Jerry.* Along with KL7VT at Sumit, Alaska's KL7's AH, AUV and myself here at Anchorage we hope to put Alaska on the six meter map now and then. KL7VT has already made the span to the states several weeks ago. So here's looking forward to sending out a few KL7 QSL's on six in the future." *Agreed, Jerry! We'll be looking for ours in the next mail.*

Hamfest

The Turkey Run V.H.F. Picnic will be held on July 28, 1957 at Turkey Run State Park, Indiana. Registration begins at 9:00 A.M. Bring your lunch and enjoy the day with us. Games for the ladies; swap table and prizes as usual. Sponsored by The Wabash Valley Radio Club. *This is another one of the well-known "do's" that shouldn't be missed.*

Radio Club Venezolano

Here is the YV gang active on six meters:

YV5AE—50.080
YV5BS—50.160
YV5GB—50.100
YV5BX—50.400
YV5GU—50.250
YV5FK—50.200
YV5BI—50.222
YV5AC—50.050
YV5AP—50.170

So far not a contact has ever been made with W stations. There are some reports of hearing W's over here and also YV's over there, but that is all. *Let's get with it fellows and work 'em.*

73, Sam, W1FZJ

High scoring two meter operator in the spring "CQ" VHF contest, W2ONV. Bill runs 950 watts to a pair of 4-125A's. Antenna is 32 elements, colinear. Receiver, pair of 417A's. States worked so far, 21. Contest score, 203 and fifty, for a total of 20,300.

Can't figure this out? Write to Smitty (W1FMK).

Donald L. Stoner, W6TNS
P. O. Box 137
Ontario, California

It's time to welcome my guests back into the Novice Shack again this month, so "gentlemen (and ladies) be seated". We have several topics to discuss this visit and lots of letters, too.

Novice Clubs

Each of you have probably considered joining or organizing Novice clubs at one time or another. Such a club might consist of a few fellows who have a common interest in getting together, or it might be a large group complete with the self designated experts on Roberts Rules of Order. Whether large or small, the basic aim of any Novice club should be to encourage each member to obtain his General Class license and to help each member operate his station more efficiently. It goes without saying that the club would help prospective amateurs obtain their Novice class licenses. Your school (and quite often your church) is always interested in having you belong to such a group. If you "play your cards right" your school can provide you with room for your club meetings. If the spokesman for your group is a real "ball of fire", it is even possible to obtain limited funds for obtaining equipment for an amateur station. Naturally, you will need an adult supervisor (he's the one who gets the blame when things go wrong) who will have custody of the station and keep things moving. The custodian need not be an amateur (although this would be preferred), it could be your Science teacher or any other interested party. If you would prefer not to have the club as part of your school activities, you can always find a local ham who is willing to help a group of fellows start a club. Thank heavens there are still people who are not wrapped up in their own little worlds and can contribute time to such a worth while purpose.

Have you ever considered starting a Novice branch of your local amateur radio club? You are probably well aware of the situation at most clubs. First, you sit through 30 minutes to an hour of new, old, and very old business. Then comes a 10 minute recess and then a one or two hour discussion on "How to neutralize the UX-99 with the new parasitic vomit rod", or some such other topic that is of little or no interest to Novices. The other members may be enthralled, but the beginning ham doesn't get too much out of it. You could hold a branch meeting at one of the Novice member's house each month or at the club house before the regular meeting starts. Each meeting, a Novice could give a short talk about something of general interest to the group. Such topics might include how you snagged some rare DX, your technique for working all states, how you got rid of the TVI in your rig or how to copy your "super duper" antenna. The topics are limitless. Code practice sessions and group discussion on the General class question are also in order.

Why not give it a whirl? If you desire more information on this subject, try and get a copy of the August, 1951 issue of CQ Magazine. An article on page 14, titled "How to Organize a Novice Club" really gives you the "scoop" on how to go about it.

QSL Bureaus

In each U.S. call zone someone is designated to handle QSL's to W and K and Novice hams from outside the United States. The reason that DX cards may not be send directly to you is that the DX station finds it less expensive to tie up ten bundles of cards to each call area, where they are kept until you call for them. This distribution point for QSL cards is called a QSL bureau. Since someone has to pay the postage on your cards you are supposed to send a self addressed stamped envelope to your

Tima Popovic, YU1FR, our European correspondent from Yugoslavia.

The neat short wave receiving station of Ulf Ericsson, SM6-2801 located in Vanersborg, Sweden.

Michael Lillard, 1016 N. 18th Street, Lafayette, Indiana probably has his ticket by now. He will be running a Heath DX-35 and an AR-3 Receiver into a vertical antenna.

A father and son team in the person of KN6VSO and KN6VSN. They have been on the air about three months and the best DX is Ohio. Terry works the evening shift and his dad works the late shift so there is no problem of who works the rig!

local QSL bureau. You cannot expect them to pay the postage to forward your cards to you, now can you? Even though you do not think you have any DX cards in your QSL bureau, send them a self addressed stamped envelope, anyway. You might be surprised! Don't forget that often when you work a ham, and he cannot find your QTH in the Callbook, he will send your card to the bureau. Many times, short wave listeners will hear you in foreign countries and forward a card to your bureau. To prove my point, here's the word from K8DCP. He says, "I was working W9JZK, QSL manager of NNQB. He asked me to write U and ask for some help via the Novice Shack. It seems the boys in the 9th district don't send envelopes in to the bureau. He has a lot of DX QSL's for the boys, but no envelopes. The situation seems to be the same in all districts. 73's Gregory Andracke." That's it in a nutshell, men, let's help the QSL bureaus clean out their files.

Novice QTH Book

Along similar lines, I received the following information from Phil Bartling, W3IFO, 212 Washington Avenue, Towson, Md. Phil is going to start a Novice QTH book that may help out the QSL situation. "It will consist of complete listings of Novice stations printed every six months. Then each two months there will be a supplement printed to catch the original list up to date. The cost to Novices will be $1.50 per year subscription and will consist of a total of 6 issues." I think Phil has a wonderful idea here and the Novices can help him by sending their QTH's to Phil for inclusion in the listing. This will insure greater accuracy and help you get your cards.

Who's Heard in Europe

The monthly missle from Tima Popovic, YU1FR, reads something like this: "I am adding some stations received on 7 mc. However, this band is very noisy here (QRN and commercial QRM) so that it seems much harder to follow the Novice traffic on it. Nevertheless, I hope to send you a substantial list of 7 mc and possibly 3.5 mc Novices." The following stations were heard from March 27 to April 24 on the 21 mc band between 1700 and 2100 GMT, roughly:
KN1ACW, ADG, ADQ, AFD, AIN, AYO, WNIKSW, LIN, LSH, NKV, NWD, NWE, NYK, KN2SEL, UBG, UVG, UXY, UYK, UZB, VKI, VQQ, VWT, YBE, YGE, YGY, YIZ, YJH, YTK, YYH, YZD, ZAT, KN3-AAW, WN3HEZ, HSI, IWN/4, JXI, JXS, JZR, KQX, KRM, LHT, LVY, MAT, WP4-AJI, KN4CIA, JBY, JGD, KEX, KGJ, KNS, KRK, KYU, LDY, LGM, LGQ, LHC, LJK, LMD, LMX, LXJ/4, LXN, MGB, MIA, MON, MPA, MQG, MSA, MST, OAR,

ODC, OHV, OIH, OIX/4, RWD, VIP, KN5-EZI, HAD, HQE, HSP, IFL, KN6YQC, KN6YTI, UFI, WN7DZC, FHZ, KN8-AQJ, AZE, CQA, CXY, DEI, DJY, DMH, DTF, DYW, EAD, EAP, EHY, KN9DCF, DFK, DOP, ETG/Ø, EUZ, EYD, GMD, GSG, GTG, GVW, HCF, HKJ, ZLL, KNØ-GWA, HCY, HWB, HXX, HZF, IFN, IKL, IYX.

On the 7 mc band, May 1st, between 0130 and 0300 GMT: KN1AOA, BGA, LFM, WN1OQK, KN2GPA, TMG, TPL, UPH, UQD, VIP, YCG, YLW, ZPT, WN3AHB, GYE, JSZ, KN4JBE, JJO, KLX, OGJ, OUC, KN8DYX, KN8EJB, EKB.

I believe that Tima still has some of his SWL cards so if you are on the list send him one of your QSL's and get one in return. His QTH is Tima Popovic, YU1ER, Banat, Novo-Selo, Yugoslavia. Believe me his cards are mighty pretty and will look good on your ham-shack wall. Although Tima did not request it, it might be a nice gesture to send him some international reply coupons to cover the cost of postage. Use odd types of stamps on your letters for Tima's stamp collector friends. His letter continues: "Here is a list of Novice call signs which were call by DX stations, but seemingly did not result in QSO's, KN1MIX (DL3RK), KN2RYU (VQ4GP), WN3GLZ (G3JIO, G3BGM and GW3ANU—wow! . . . ed.) WN3JYF (ZS6EU), KN4JFE (G2DCF), KN4OAR (GW3IJE), KN4OBC (VE3HP), KN6VXM (G3FMN), KN8AKB (G3KLD), KN8DRZ (G3KLD), KN8EAW (ZS6EU), KN9GVE (ON4JP), KNØHGB (OH3LA), KNØIAT (OH4LA). 73's Tima. Tough luck fellows, be sure to listen for those *weak ones*. Nine times out of ten, they are the juicy DX!

More European reception is reported by another correspondent. Ulf Ericsson, SM6-2801, Sandelhielmsgatan 3, Vanersborg, Sweden. He reports: "I have heard several Novices on 21, 7 and 3.5 mc, but there is a lot of QRM among them, particularly on 7 mc, where the BC QRM is terrible. Therefore, I am building a Q multiplier for my receiver, a BC-348L with a converter for 21 and 28 mc. I would like to hear from the following Novices to tell them their strengths here in SM land. On 3.5 mc, KN2SNP, WN3JMG, KN4MSN. On 7 mc, KN1AMA, ATW, AWF, ANO, ANQ, KN2VVE, VUV, YZS, NWJ, TMG, SPF, VZE, ZHY, VNL, TSI, UQW, UCA, TVX, WN3ISP, KIG, EED, MKR/3, KN4-MMA, MKX, MIA, LTE, LZW, OLA, LSG, KTG, MVG, OII, MUP, LXT, KIC, FOC, OLP, KN8DPD, EOS, KN9GKD, HOA, and KNØJCQ. On 21 mc among others I heard KN8CUS, ATN, EEX, KN9GVE. I am waiting for my license for 9 months and I hope I shall get it soon. 73's Ulf." (*And you guys think the FCC is slow!*) If anyone listed would like one of Ulf's fine business SWL cards send him one of yours to the aforementioned QTH. Incidentally, several of the calls listed have QSL cards in the WN1 and KN1 QSL bureau according to Pete Butler, W1BPW, 88 South Avenue, Whitman, Mass. He says that one Novice has 14 cards in the bureau, including many DX cards. Send in a self addressed stamped envelope to Pete, men, one of you is the lucky guy!

Novice Harmonics

A while back, I printed a letter from Ernie Crump, VE3EGG about Novice signals in the 20 meter band. I misquoted Ernie in that his complaint was about Novices that were operating on 15 meters. It seems that some Novices operating on 15 are radiating 2nd harmonic energy from their 7 mc oscillator in addition to the wanted 3rd harmonic. This puts the Novice signals about 14.08 mc (in the 20 meter DX band) rather than up at the high end of 20. Sure enough, I listened down there and heard two Novice stations at that time. I advised them by post card. You might check your 14 mc radiation when you operate 15 meters. Use the same technique as described for checking your 2nd harmonic radiation when on 7 mc.

Help Offered

Maurice Bourque, VR2VZ, 1071 Perry St., Sherbrooke, P. Q. Canada is interested in forming a club and give free code and theory lectures if he can locate interested parties.

Lester Sade, 652 Second, San Burno, Calif. would be very glad to help any would be Novice or Technician operators, either those close to his city in person, or those farther away by mail.

K6USN, Treasure Island is on four nights a week on 1978 ks, 3590 kc and 7136 kc with code practice.

Help Wanted

Jeanie Simpson, 4121 Scholes Street, Riverside, California wants to be a ham more than anything else. She needs help with the code and theory.

Calvin E. Bayley, Main Street, Picture Rocks, Penn. would like help with the code and theory so that he can become a ham.

Alan Birnholz, KN2VAB, 634 High St., Newark 2, N. J. would like help from a local ham so that he can obtain his General class license.

James Ogle, 323 12 Avenue East, Albia, Iowa needs help with the code.

Leo Hay Sr., 1237 W. Cleveland Avenue, Hobart, Indiana would like to meet a local ham operator to get help on the code and theory. He would also like to see a ham shack.

Joe Glaherty, 615 North 30th, Billings, Montana would like help with the code and theory for his ham ticket.

Dave Reinhart, K8BPX, 1927 Madison Ave-

Now there's what I call an XYL. Joyce Polley, KNØIKL is working on her rotatable dipole. I guess she's not happy with working 46 states, 3 continents and 9 countries. Joyce is looking for Nevada and Vermont for WAS. How about it fellows?

The station of K5BQS, Pascagoula, Miss. Jimmy has worked 47 states and he would like to sked anyone in Wyoming. DX is South Africa, New Zealand, Greenland with 17 countries and 12 confirmed.

nue, Cincinnati 31, Ohio wants help obtaining his WAS—*bad*.

Steave Hahnert, 2210 N. York, Dearborn, Michigan Phone CR-82210 needs help with the code and theory.

V. J. Nichols, 7944 Bexhill Rd. Norfolk 5, Va. Phone JU-32174 needs help with the code and theory.

Dick Allyn, 4141 Vincent Avenue South, Minneapolis, Minn. would like help with the code and theory.

Letters to the Editor

Let's get the ball rolling this month with a DX "contact." Alfredo Tardaguila, CX9AJ, Caraguatay 2269, Montevideo, Uruguay says:

Dear Don:

I'm sending this line to prove to you that also in South America the Novices are enjoying very much your column. I've been an SWL for 3 years and now I'm running a homemade xmittr (12 watts input) on 6 meters phone. The receiver is an HRO-7, the antenna is a 3 element beam and I'm xtal controlled on 50.244 kc. The first contact I make was with XE1GE in Mexico and since then (only a month) I've worked many stations including three K6's. My distance record is K6JCA located in the Mojave Desert. (*Nice going Cris*) I will be looking for skeds on 6 meters. 73 and good luck. Alfredo.

This letter is a "first" for Paul Dodson, KN5IRP, 1311 Jefferson, Amarillo, Texas. He says:

Dear Don:

Ham radio has finally induced me to write my first letter (and only) to any magazine. The pleasure I have received since my ticket arrived has been immeasurable. The score stands at 31 states and Canada with 27 confirmed after four months of operation on 15 meters and only one crystal, 21190 at that! My rig is a Globe Chief and an S85 with an indoor folded dipole made entirely of 300 ohm ribbon. I belong to the Panhandle Amateur Radio Club. Best 73's Paul, KN5IRP.

A DX "gun" writes:

Dear Don:

I've been DXing for 3 weeks now (I use the term lightly-Hi.) et have come up with 14 states, a CO and a WP4. The rig is an Adventurer and a HQ-100. I work 40 and 15 meters. I like 15 the best. My antenna is a 40 metr. doublet and I am planning on putting up a 15 meter ground plane which should help me work more DX. What happened to the W7 area? I just can't seem to work any. (*They're still there, Roger.*) I would be glad to sked anyone needing Florida. 73's Roger KN4MZN, 851 N. E. 128th St. No. Miami, Florida.

Probably by this time Charles Harris, Route 8, Box 717, Greensboro, N. C. has dropped the "N" from KN4JQU. He writes:

Dear Don:

I am 13 and have had my Novice ticket since 6-11-56. Since then I have worked DL7, WL7, G3, KP4, VE2 and 3, and 40 states, with 31 confirmed. I am going for my General May 4th (hope I pass!) 73's Charles. (*By George, I hope you do too, Charles.*)

Jeff Abbott, KN2ZCT, forgot to include his QTH, but his letter goes like this:

Dear Don:

I received my license a few weeks ago. My transmitter is a Globe Chief and my receiver is a borrowed S-40. I work 15, 40 and 80 meters. I have been on very little because of pressing school work. (*I know what you mean Jeff!*). I have a total of 8 contacts in 3 weeks with 5 states worked. My main interest is VHF and I have a two meter station in the works. Also, I am building a 3 element 15 meter beam. 73's Jeff.

A man with a problem is Walt Bieda Jr. 348 Hartford Avenue, Buffalo 23, N. Y. It goes like this:

Dear Don:

Would it be possible to raise the power output of the DX-35 without altering it too much? I would appreciate any ideas and schematics you might think of. 73's and gud luck. Walt. *Well, Walt, you can push the 6146 into overratings but on the receiving end you would not hear the difference. You must double the power output of the DX-35 before you can notice an increase on the receiving end, therefore, I would not recommend that you make any modifications.*

A letter from a "tech" wound up in the Novice and Technican column. He writes."

Dear Don:

I have a Viking Adventurer that I would like to convert to 6 meters. Also, I have an ARR-1 that I am

planning to make a 6 meter converter to feed an S-38. Wonder if you have any information on these projects? Sincerely Richard L. King, W9MWF, RR #1 Clinton, Indiana. *According to the Johnson Factory, it would be difficult to convert the Adventure to 6 meters Dick. The ARR-1 will work on 6 if you wind a new set of coils for that band and install an i-f transformer in the output circuit.—*

Mark Leroy, 662 Howard Avenue, West Hempstead, N. Y. forgot to include his call but he did include some sage advice.

Dear Don:

The handle at this end is Mark. I've been using the Novice bands since October and I have found one thing wrong with many Novices operating practices. Lots of us call CQ for 5 to 8 minutes and give a call sign 10 times and sign over. This is unpleasant to the guy at the other end and causes QRM. Then there is the constant CQ'er. He calls CQ signs, doesn't tune and calls CQ again. This too will cause QRM and it won't get you a QSO. So remember fellers, use careful operating practices. If anyone has anything else to say on the subject please write me. 73's, Mark. *There is one sure cure for those gents, Mark. When you hear a long CQ'er, just ignore 'em. I do! If enough hams did, they wouldn't call so long after they saw that it didn't pull QSO's.*

Hi Don, I passed my exam Thanksgiving '56 and got my ticket Jan. 18, '57. My standings now are 42 state wise and 23 countries worked. (Countries confirmed—top secret). Just got ZS6AOI this morning for WAC. Some of the other goodies are HB9, YU3, FK8, WB6, VP9, PAØ, OA4, G's, JA1, and the VK's and ZL's. (I'm going to stand in the corner—gad!) The rig here is a home brew 6146 running a Novice kw. (75 watts) to a 15 meter folded dipole about 35 ft. up. The receiver is an SX-71. I devote 85% of my time *Listening.* (*I guess!*) 73's Don Jensen, KN6VXM, 1320 Tennessee St., Vallejo, Calif.

Dave Ulmer, Jr., WN3JYQ, North Hillview St., Flemington, Penn. is taking that big step. He writes:

Dear Don:

I am 16 years old and a junior at the Lock Haven High School. I am gunning for September to take my General exam and I am wondering just what books to study and how to go about studying them. In other words, could you recommend some good books on radio theory? Nothing that requires a college degree to understand but some that start at the beginning and are in simple language. How about more articles on how a receiver, transmitter, oscillator, etc works? 73's Dave *There are many fine books available Dave, such as the two phamphlets put out by the ARRL or the Radio Amateurs Handbook. I suggest the Novice and Technician Handbook by W6SAI and myself.*

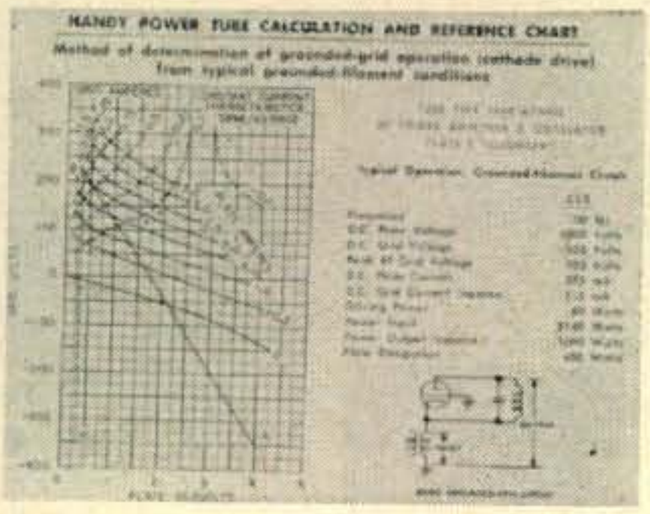
A letter by "tower builder supreme," Ed Marks, describes his $15.00 tower that was mentioned in the column several months back.

Mr. Stoner:

I have received requests on further construction details regarding my tower. I personally answer all mail and will reply to interested readers. The three sets of guy wires anchor the mast and are broken up with ball porcelain insulators every 10 or 12 feet. They do not re-radiate spurious harmonics. Best of 73's Ed T. Marks, 3661 W. Ogden Blvd., Chicago 23, Ill. *Many thanks for the information Ed. I am sure you will be getting many requests for more information on your tower.*

I see that it is time to close up the Novice Shack for another month. Good DX'ing to everyone and I hope to work you on the air.

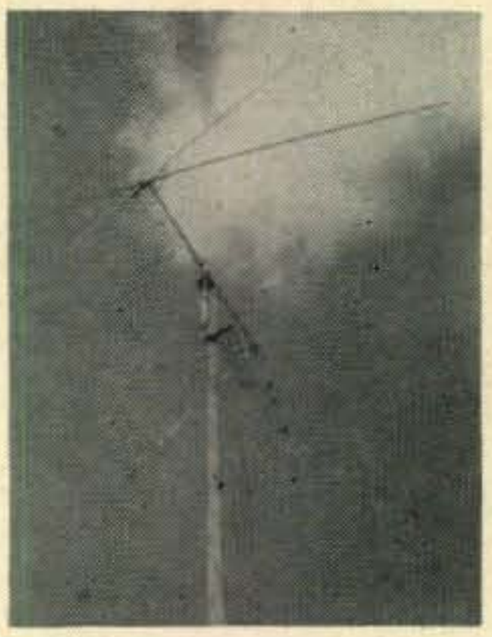
73, Don, W6TNS



Free Free Free Free Free

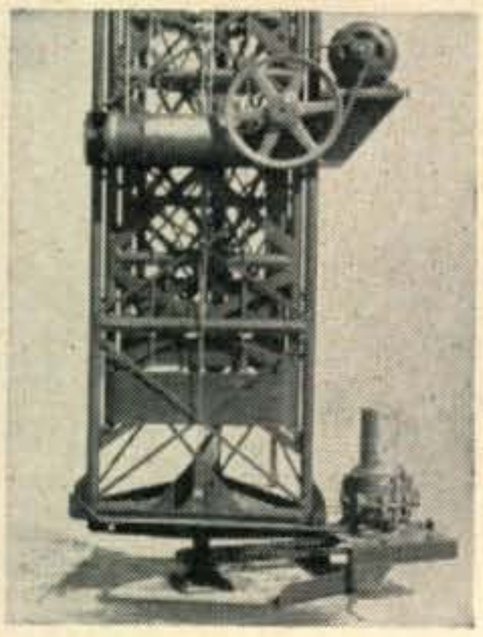
The only way to break companies of the habit of giving something away free is to take them up on it. Amperex has a "handy power tube calculation and reference chart" which is backed up by an "Emission capabilities of power tubes, empirical values" chart. Circle B on page 126 so we can have them send you one. Still not convinced? Well, the sub-title on the chart says, "method of determination of grounded-grid operation (cathode drive) from typical grounded filament conditions." There, now will you write?

Skylane Quad



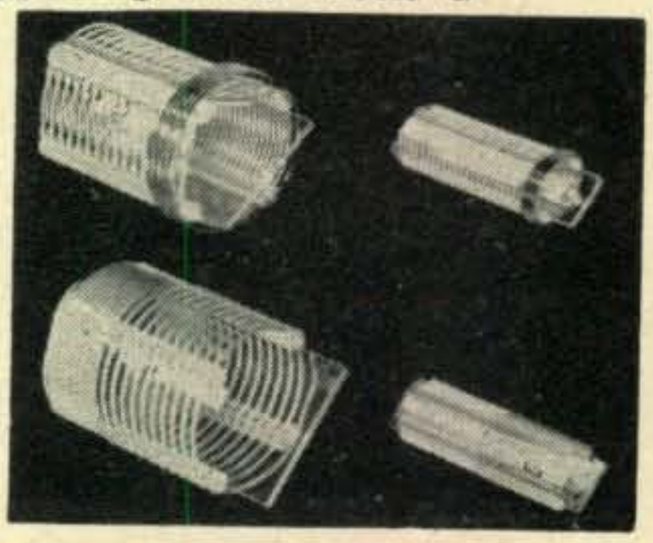
Skylane Products of Tampa (W4YM) have announced a three band Quad which sells for $59.95. Covering 10-15-20 with better than a 2:1 SWR it features an aluminum boom with bamboo spreaders for light weight and flexibility. Circle H on page 126 for data sheet.

New Products



Self Supporting Towers

Tri-Ex Tower Corporation has a line of really sturdy rotating self-supporting towers that will interest every DX man. Illustrated is the 71' crank-up self-supporting rotating tower, just about all anyone could ask for in flexibility. Prices start at $199.50 for the crank-up rotating self-supporting units. Circle G on page 126 and get the full dope.



New Pi Air Dux Coils

Illumitronic Engineering has announced a series of coils designed for pi output circuits. They are available in either indented or variable pitch types. The indented coils make it easy to tap or clip on. Variable pitch coils make it easy to get the correct inductance at higher frequencies. They are available in all common sizes and for different impedances, power capabilities, and frequency ranges. Circle F on page 126 for data sheet.

PROPAGATION

George Jacobs, W3ASK
607 Beacon Road,
Silver Spring, Md.

1947 Sunspot Peak Surpassed

The Zurich provisional mean sunspot number for April, 1957 is reported as 175.2. This results in a 12-month smoothed sunspot number of 154 centered on October, 1956. *The present sunspot cycle has already soared beyond the 1947 peak of the previous cycle, and solar activity is now more intense than at any time since 1778.*

Fig 1 graphically depicts the rapid rise of the present sunspot cycle, the 19th observed since the invention of the telescope. *Figure 2* shows the value of peak solar intensity recorded during the previous 18 cycles. A peak smoothed sunspot number of 152 was recorded for the last sunspot cycle during May, 1947, and the most intense solar activity ever recorded was a smoothed sunspot number of 158.5 during May, 1778. Based upon the present trend of cycle 19, a smoothed sunspot number maximum of 164 is predicted for March, 1957. While it will be several months before this can be verified, it now appears relatively certain that *the present sunspot cycle will be more intense than any recorded previously.*

For a more complete discussion of the sunspot cycle and its influence upon shortwave radio propagation conditions, reference is made to *The Sunspot Story; Cycle 19* appearing in the *March* and *June, 1956* issues of *CQ*.

Propagation Conditions—July

6 Meters:

Occasional short-skip openings between 1000 to 1400 miles are expected as a result of the seasonal increase in sporadic-E type propagation. Considerable meteor type openings are also expected during the last week of July as a result of the Perseids and Aquarids meteor showers.

ALL TIMES IN EST

Eastern USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western Europe	11A-2P (1) 2P-7P (2) 7P-9P (1)	7A-1P (2) 1P-3P (3) 3P-7P (4) 7P-10P (2)	10P-4A (3) 4A-6A (2) 6A-1P (1) 1P-3P (2) 3P-10P (4)	7P-9P (2) 9P-11P (3) 11P-2A (2) 9P-12M (2)*
Central Europe	1P-6P (1)	7A-1P (1) 1P-4P (2) 4P-7P (3) 7P-9P (1)	1P-3P (1) 3P-6P (2) 6P-10P (3) 10P-5A (2)	7P-1A (2) 8P-11P (1)*
Eastern Mediterranean	2P-6P (1)	7A-11A (1) 11A-1P (2) 1P-5P (3) 5P-9P (2) 9!-11P (1)	12N-4P (1) 4P-11P (3) 11P-6A (2)	7P-11P (2) 8P-10P (1)*
North & Central Africa	1P-3P (1) 3P-5P (2) 5P-7P (1)	5A-11A (1) 11A-2P (2) 2P-7P (4) 7P-10P (2)	1P-4P (1) 4P-1A (4) 1A-7A (2)	7P-2A (1)
South Africa	1P-5P (2)	12N-2P (1) 2P-4P (2) 4P-7P (3) 7P-10P (2)	2P-4P (1) 4P-6P (2) 6P-9P (3) 9P-1A (2) 1A-4A (4)	6P-1A (1)
South America	7A-2P (2) 2P-6P (3) 6P-9P (2) 9P-1A (1)	6A-9A (3) 9A-3P (2) 3P-5P (3) 5P-10P (4) 10P-6A (2)	1A-7A (3) 7A-3P (2) 3P-6P (3) 6P-1A (4)	7P-1A (2) 1A-6A (3) 11P-5A (1)*
Australasia	7P-10P (1)	7A-9A (1) 5P-7P (1) 7P-9P (2) 9P-11P (3) 11P-1A (2)	3A-6A (2) 6A-8A (3) 8A-10A (2) 9P-11P (2) 11P-3A (2)	1A-6A (2) 2A-5A (1)*
Malaya & South East Asia	NIL	6A-8A (1) 1P-5P (1) 5P-8P (2)	6A-8A (1) 6P-12M (2)	NIL
Guam & Pacific	NIL	5P-7P (1) 7P-11P (2)	10P-3A (2) 3A-6A (1) 6A-10A (2)	NIL
Japan & Far East	NIL	5P-7P (1) 7P-10P (2)	7P-9P (1) 9P-2A (2) 2A-6A (1) 6A-8A (2)	NIL
Philippine Is. & East Indies	NIL	2P-5P (1) 5P-10P (2)	6A-9A (1) 6P-12M (1)	NIL

ALL TIMES IN CST

Central USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Western and Central Europe	1P-4P (1)	7A-11A (1) 11A-2P (2) 2P-6P (3) 6P-8P (2)	5A-2P (1) 2P-6P (2) 6P-11P (3) 11P-5A (2)	7P-11P (2) 11P-1A (1) 8P-11P (1)*
Southern Europe & North Africa	11A-1P (1) 1P-3P (2) 3P-4P (1)	6A-2P (1) 2P-6P (3) 6P-8P (2)	2A-3P (1) 3P-5P (2) 5P-8P (4) 8P-12M (3) 12M-2A (2)	7P-11P (2) 11P-1A (1) 8P-11P (1)*
Central & South Africa	1P-3P (1) 3P-6P (2) 6P-7P (1)	11A-2P (1) 2P-7P (3) 7P-9P (2)	12N-2P (1) 2P-4P (2) 4P-8P (3) 8P-1A (2)	7P-10P (2)
South America	6A-12N (2) 12N-3P (3) 3P-6P (4) 6P-11P (2)	6A-9A (3) 9A-2P (2) 2P-4P (3) 4P-11P (4) 11P-6A (2)	2A-8A (3) 8A-2P (2) 2P-4P (3) 4P-2A (4)	7P-4A (3) 4A-7A (2) 9P-4A (1)*
Antarctica	1P-4P (2) 4P-6P (1)	12N-2P (1) 2P-4P (2) 4P-6P (3) 6P-8P (2) 8P-10P (1)	4P-6P (1) 6P-10P (3) 10P-6A (2) 6A-8A (1)	10P-4A (2) 12M-3A (1)*
Japan & Far East	7P-10P (1)	4P-8P (2) 8P-11P (3)	5P-7P (2) 7P-2A (3) 2A-6A (1) 6A-8A (2)	2A-6A (1)
South East Asia	NIL	6A-9A (1) 1P-4P (1) 4P-10P (2)	6A-9A (1) 6P-11P (2) 11P-1A (1)	NIL
Hawaii	5P-10P (2)	10A-2P (2) 2P-5P (3) 5P-10P (4) 10P-2A (2)	2A-4A (3) 4A-7A (2) 7A-9A (3) 9A-5P (2) 5P-2A (4)	10P-7A (3) 11P-6A (2)*
Australasia	5P-10P (2)	4P-6P (2) 6P-10P (3) 10P-1A (2) 1A-9A (1)	8P-10P (2) 10P-2A (4) 2A-4A (2) 4A-9A (3)	1A-7A (3) 2A-6A (1)*

ALL TIMES IN PST

Western USA To:	10 Meters	15 Meters	20 Meters	40/80 Meters
Europe & North Africa	NIL	6A-11A (1) 11A-4P (2) 4P-6P (3) 6P-10P (1)	1P-3P (1) 3P-5P (2) 5P-10P (3) 10P-1A (2)	6P-11P (2) 8P-10P (1)*
Central & South Africa	3P-6P (1)	11A-1P (1) 1P-3P (2) 3P-6P (3) 6P-12M (2)	6A-8A (1) 2P-4P (2) 4P-7P (3) 7P-12M (2)	6P-10P (2) 7P-9P (1)*
South America	6A-10A (2) 10A-12N (3) 12N-6P (4) 6P-8P (2)	5A-7A (3) 7A-12A (2) 12N-3P (3) 3P-8P (4) 8P-5A (3)	2P-4P (2) 4P-12M (4) 12M-4A (3) 4A-8A (2) 8A-2P (1)	5P-8P (2) 8P-11P (3) 11P-3A (2) 9P-12M (1)*
Guam & Pacific Islands	12N-2P (2) 2P-7P (1) 7P-10P (2) 10P-12M (1)	12N-7P (1) 7P-10P (2) 10P-4A (3) 4A-9A (2)	12M-4A (1) 4A-6A (2) 6A-10A (3) 10A-12N (2)	12M-6A (2) 1A-4A (1)*
Australasia	1P-5P (2) 5P-10P (4) 10P-12M (2)	12N-2P (2) 6P-8P (2) 8P-11P (4) 11P-3A (2)	8P-10P (2) 10P-2A (4) 2A-8A (2)	10P-12M (1) 12M-4A (2) 4A-6A (1) 12M-3A (1)*
Japan, Okinawa & Far East	12N-6P (1) 6P-11P (2)	7A-12N (3) 12N-7P (2) 7P-12M (4) 12M-7A (2)	9P-12M (3) 12M-4A (4) 4A-9A (3) 9A-12N (2) 12N-9P (1)	1A-5A (2) 2A-4A (1)*
Philippine Is. & East Indies	2P-8P (1) 8P-10P (2)	7A-12N (3) 12N-3P (2) 3P-9P (1) 9P-2A (2) 2A-7A (1)	2A-6A (2) 6A-8A (3) 8A-11A (2)	NIL
Malaya & South East Asia	11A-2P (2) 2P-6P (1) 6P-8P (2) 8P-10P (1)	7A-12N (3) 12N-3P (2) 12M-2A (1)	2A-6A (1) 6A-9A (3) 9A-12N (2)	4A-7A (1)
Hong Kong, Macao & Formosa	12N-6P (1) 6P-10P (2)	7A-12N (3) 12N-4P (2) 4P-9P (1) 9P-7A (2)	2A-7A (3) 7A-9A (2) 9A-12N (1)	2A-6A (1) 3A-5A (1)*
New Zealand	12N-4P (2) 4P-7P (3) 7P-9P (2)	11A-1P (2) 1P-5P (1) 5P-9P (3) 9P-11P (2)	7P-9P (2) 9P-12M (4) 12M-6A (1)	10P-2A (3) 2A-6A (2) 11P-4A (1)*

CQ PROPAGATION CHART (SHORT-SKIP)

BAND (METERS)	50-250	DISTANCE (MILES) 250-600	600-1200	1200-2200
10	NIL	NIL	8A-2P (3) 2P-8P (2) 8P-8A (1)	9A-8P (2) 8P-9A (1)
15	NIL	9A-2P (1)	8A-4P (4) 4P-8P (3) 8P-8A (2)	9A-2P (3) 2P-10P (4) 10P-9A (2)
20	NIL	6A-11A (2) 11A-3P (3) 3P-8P (2)	8A-4P (4) 4P-9P (5) 9P-8A (2)	7A-11A (4) 11A-2P (3) 2P-10P (5) 10P-7A (3)
40	6A-10A (3) 10A-8P (5) 8P-10P (4) 10P-6A (2)	6A-10A (4) 10A-5P (3) 5P-12M (5) 12M-6A (2)	7P-2A (5) 2A-8A (4) 8A-10A (3) 10A-5P (1) 5P-7P (3)	6P-8P (3) 8P-5A (4) 5A-7A (3)
80	5A-11A (4) 11A-6P (3) 6P-5A (5)	7P-9P (3) 9P-5A (5) 5A-7A (3)	8P-10P (2) 10P-5A (4) 5A-7A (2)	8P-10P (2) 10P-4A (3) 4A-6A (2)
160	5P-8P (3) 8P-5A (5) 5A-7A (3)	8P-10P (3) 10P-4A (4) 4A-6A (3)	9P-4A (2)	9P-4A (1)

SYMBOLS FOR NUMBER OF DAYS CIRCUIT FORECAST TO OPEN:

(1) 1-4 days (2) 5-11 days (3) 12-18 days (4) 19-26 days (5) over 26 days

* Indicates possible eighty-meter openings.

Time Symbols: A - A.M. N - Noon
P - P.M. M - Midnight

The CQ DX Propagation Charts are based upon a radiated CW power of 150 watts at radiation angles less than thirty degrees and are centered on the Eastern, Central and Western areas of the USA. They are valid through August 15, 1957. The CQ Short-Skip Propagation Chart is based upon a radiated CW power of 75 watts, using a dipole antenna a half-wave length above ground. It is valid through August 31, 1957. All forecasts are based upon ionospheric data published by the Central Radio Propagation Laboratory of the National Bureau of Standards, Boulder, Colo.

10 Meters:

Seasonally lower maximum usable frequencies will result in considerably less ten-meter DX openings than during the spring months. The band is expected to open quite regularly to South America during the late afternoon and early evening hours, but openings to other areas of the world are not expected to occur very often during July. Sporadic-E short-skip openings should be possible on most days with the skip distance generally between 600 and 1300 miles.

15 Meters:

Very good propagation conditions are forecast to almost all areas of the world during the late afternoon and early evening hours. Circuits to South America, and other areas of the world, may remain open almost around the clock. Intense short-skip openings between distances of about 500 to 2200 miles are most likely to occur daily, especially during the daylight hours.

20 Meters:

Twenty-meters is expected to be the best DX band during the hours of darkness. From the late afternoon hours, through the evening, and until shortly after sunrise, good propagation conditions are forecast to almost all areas of the world. High solar absorption will limit most daytime openings to distances between 300 and 2000 miles.

40 Meters:

Seasonally high static levels will limit long distance propagation to occasional openings from a few hours after sunset to shortly after sunrise. Daytime skip will vary between 100 and 400 miles, becoming greater as the hours of darkness approach.

80 Meters:

Seasonally higher static levels and ionospheric absorption will result in poor DX propagation conditions on this band. An occasional opening to some areas of the world may occur during the hours of darkness. Daytime coverage will generally not exceed 150 miles, extending upwards to approximately 2000 miles as darkness approaches.

160 Meters:

Daytime propagation limited to less than 50 miles. Nighttime openings increasing upwards to 1500 miles or so when static levels are low.

The above discussion gives an overall picture of band conditions forecast for July, 1957, with an indication of the qualitative changes in each amateur high frequency band from month to month. For *specific times* of band openings for a particular DX or Short-Skip circuit, refer to the *CQ Propagation Charts* on the following page.

This month's forecasts are based upon a predicted smoothed sunspot number of 155 centered on July, 1957.

Operation Smoke-Puff

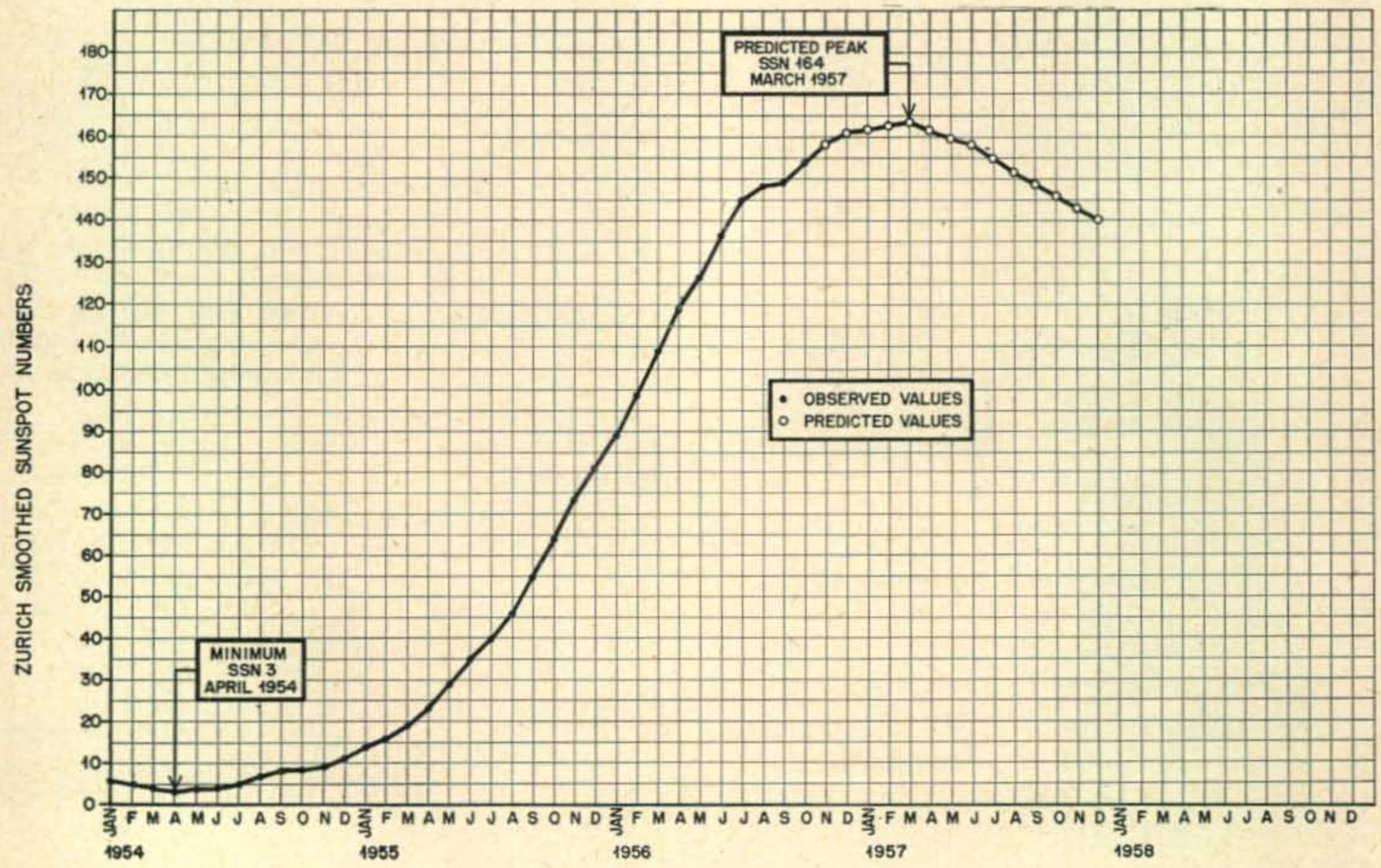
The Radio Propagation Laboratory of Stanford University has recently announced plans for *Operations Smoke-Puff,* an attempt to form a man-made ionized region high above the surface of the earth.

The experiment is planned to begin during July when Aerobee rockets, carrying nitric-oxide gas, will be fired from Holloman Air Development Center at Alamorgordo, New Mexico. About 70 miles up, the rocket will discharge the gas. If successful, the gas is expected to react chemically with other gases already present in the atmosphere to form a small, intensely ionized region. It is hoped that this man-made ionized cloud will be intense enough to reflect radio signals as high as 144 megacycles.

Owing to the earth's curvature, reflections from such an ionized cloud will be limited to transmissions originating within approximately 700 miles of the firing point at Alamogordo. *Figure 3* shows the area within which communications by reflection from this ion cloud may be possible. To what extent communications will be possible—whether for a few seconds, several minutes, or possibly hours—and what frequencies will be reflected best, will depend upon the size of the cloud formed, the ion density actually created by the cloud, and the path length. In order to determine the success of the experiment, radio amateurs and shortwave listeners within the area of communications shown in *Figure 3* are invited to participate in Operations Smoke-Puff by transmitting, or observing transmissions, on the amateur 14, 21, 28, 50 and 144 megacycle bands during the period when reflection by this artificially ionized region might be possible. Anyone residing within this circle and wishing to participate in the project should write immediately for the expected dates and times of rocket firings and complete details of the experiment to:

O. G. Villard, Jr., W6QYT
Radio Propagation Laboratory
Stanford University
Stanford, California

Fig 1. Present Trend of sunspot Cycle 19. Latest observed smoothed sunspot number is 154 centered on October 1956.



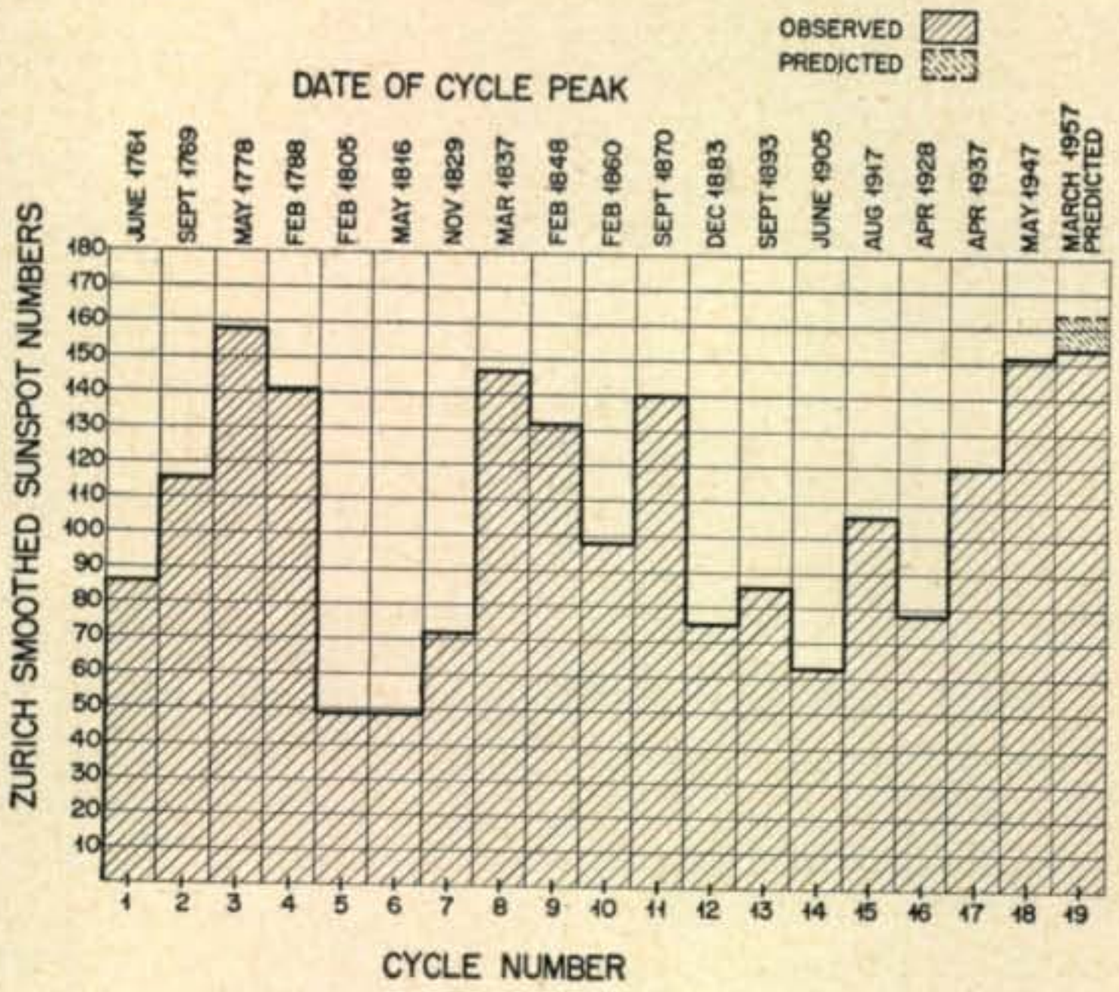


Fig. 2. Peak solar activity observed during the past 18 sunspot cycles. The smoothed sunspot number of 164 now forecast for the peak of the present cycle (number 19) is higher than any recorded previously.

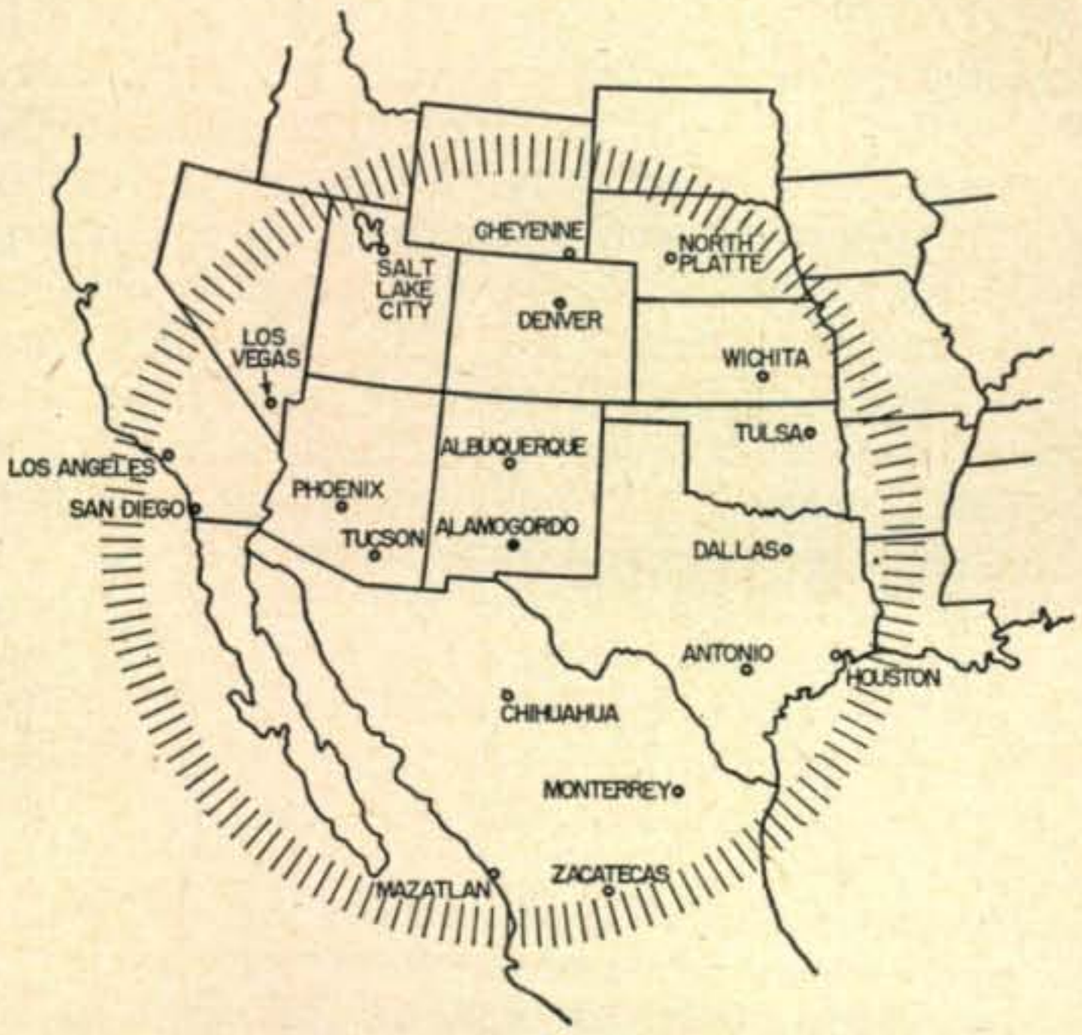


Fig 3. Circle showing area within which communications by reflection from artificial ion cloud should be possible.

If the man-made ionized cloud turns out to be effective in reflecting radio signals, it will mark man's first real step towards control of the ionosphere—a control which can extend the range of VHF communications over longer distances, and lead to more effective use of the entire high frequency range of the spectrum. Here is an opportunity, and a challenge, for radio amateurs to once again take part in an experiment that, if successful, can have a far reaching influence on the future of radio communications.

A complete article on *Operations Smoke-Puff* by O. G. Villard, Jr. and R. S. Rich, appears in the *May, 1957* issue of *QST*.

Shortwave Propagation conditions are expected to be good throughout the month of July except during the period of July 22-24 when a moderate ionospheric storm is due to occur.

I.G.Y.

On July 1st, 1957 begins the year with *eighteen* months—the *International Geophysical Year*. From the shifting ice packs of the Arctic to the frozen wastelands of the Antarctic; from the deepest depths of the oceans to the highest reaches of the earth's atmosphere, scientists from more than fifty different countries will turn their efforts during the I.G.Y. to intensive and co-ordinated research into the nature of the world around us. From hundreds of observing stations, forming a network that will completely cover the globe, the most complete set of data ever amassed concerning solar activity, weather, cosmic rays, ionospheric characteristics, geomagnetism, gravity, oceanography, glaciology, seismology, aurora and other geophysical and solar phenomena will be collected.

This great international scientific effort offers an unparalleled opportunity for increasing man's fundamental knowledge of the physical universe. It could also provide information of a very practical kind for better controlling those natural phenomena upon which our comfort and our lives depend.

Next month's column will be devoted to a discussion of the contributions radio amateurs can make by participation in various projects of the I.G.Y.

73, George, W3ASK

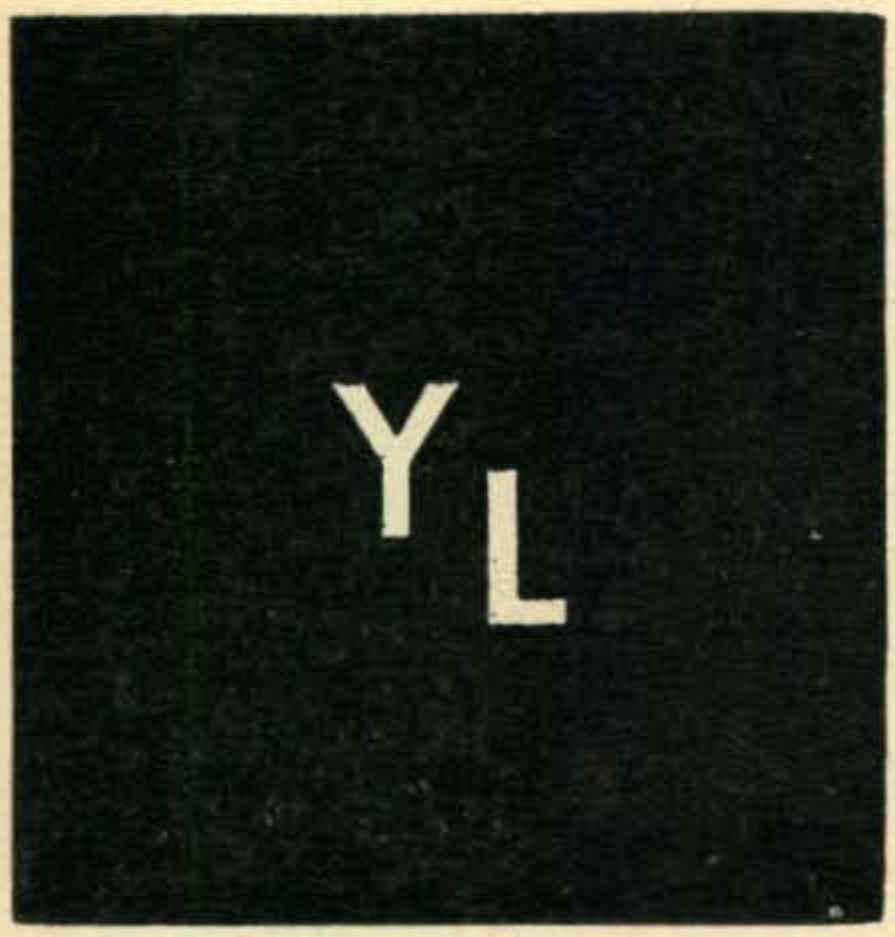
ANTARCTIC MAP

As a matter of general interest to the Ham fraternity W6EYY informs us that the U. S. Navy Hydrographic Office has issued a color map titled "Antarctic Area Stations During International Geophysical Year 1957-58." This map is quite detailed and shows the locations of all the different antarctica stations by nationality. Included on the map is an "Index of Stations" keyed by number for ease of location of all the different nations participating in the Antarctica IGY program including latitude and longitude. The word "stations" is not to be construed as "radio stations" but as "bases of operation." This map costs 25c plus postage and is known as "H.O. 16429A." It is obtainable from any Hydrographic Office Sales Agent. The following agents are listed for general coverage throughout the U.S.A.:

Geo. E. Butler Co., 356 California St., San Francisco, Calif.

R. H. John, Inc., 2218 Market St., Galveston, Texas.

C. S. Hammond and Co., 1 East 43rd St., New York, N. Y.



Louisa B. Sando, W5RZJ
212 Sombrio Drive
Santa Fe, New Mexico

Young YLs

After devoting much space in this column during the past year to the long-time YLs of 22 years or more standing, it's high time to introduce some of our newer sister YLs, especially the very young ones. The 7th call area is so blessed with young YLs that we will start with them.

WN7DNE, Kitty Barany
WN7DNF, Dinda Martin
WN7DNJ, Susan Myers
WN7DNI, Donna Clements—These 12-year-old YLs all came up with their Novice tickets last year when they were 6th grade students of W7ULK, Rosella Hansen, at Spokane, Wash. Rosella took her hobby right to her classroom, but with no time in the general curriculum the girls (and two boys) came in early in the morning to practice code. Over their sandwiches at noon they studied theory and exam questions, with another session of code at 12:30 and again after school. This year Rosella had a larger class and at last count had 12 ready for Novice exams. Without equipment of their own she didn't encourage them to get the license but has gone ahead with preparing them for General class. They have a station set up at school using W7ULK's Elmac Tran-citer from her car and mobile whip with Master coil outside the classroom window.

First radio class of Rosella Hansen, W7ULK, 6th grade teacher of Spokane, Wash. L. to r., 12-year-old YLs WN7DNE, Kitty Barany; WN7DNF, Dinda Martin; W7ULK, Rosella; WN7DNJ, Susan Myers (now in Denver); WN7DNI, Donna Clements. Boy at key, WN7DNK, Jere Hagen. All the girls happen to be Scouts as well.

2nd International YLRL Convention (With 9th National Amateur Radio Convention)

Aug. 30, 31 & Sept. 1, 1957
Palmer House, Chicago

Friday: Registration; tours through electronic plants.
Evening — free spaghetti supper and gabfest for all licensed YLs.

Saturday: 12:30 p.m. — YLRL luncheon and forum; speakers to include W3CUL, Mae, 1956 Edison Award winner; W3PVH, Betty, president of YLRL; W1QON, Eleanor, YL Editor QST; and your column editor, W5RZJ.
6:30 p.m. — Special interest dinners (SSB, VHF, DX, RTTY), or a trip to Chinatown for a real Chinese dinner.
10:00 p.m. — Entertainment in Grand Ball Room.
Midnight — Wouff Hong initiation.

Sunday: 1:00 p.m. — Chartered boat excursion on Lake Michigan (for all the family).
3:30 p.m. — Forum for all amateurs.
8:30 p.m. — Banquet with entertainment and prizes.

The convention committee is making available at the Palmer House a complete nursery staffed by RN's and a playroom staffed by pre-school and public school teachers. These will be available day and evening and will be offered free of charge to anyone registered at the convention.
More details in August CQ.

W7AUO, Barbara Demke, 13 years old, has just completed the 8th grade at Fowler Jr. High in Sherwood, Ore. Barbara got her license when 12 years old before starting the 7th grade. Her father, W7KCF, was her instructor and she made General right away. School activities (including art, band, and sports) plus piano lessons have taken much of her time, but by the mid-school year she was up to 30 States, plus KL7, KH6, JA, VE and ZL, working 20, 40 and 80 cw, and 10 and 75 phone. Barbara and her dad share a homemade transmitter, NC-300 receiver, a longwire antenna and 10-meter beam.

WN7DWD, Ginger Louderback, age 16, has just completed her sophomore year in high school at Boring, Ore. She got her Novice ticket a year ago and has been operating 80 cw since using a home-brew rig of 75 watts and an SX-25 receiver. Her dad is W7YKY. This year Ginger and other interested students started a radio club at Sandy High School with the object of getting more licensees. Other hobbies are swimming and roller skating.

WN7DYG, Linda Stringer, has completed her sophomore year at McMinnville, Ore. High School. Her brother is W7YEY.

W7DYK, Nancy Lundeen, 15 years old, will be a junior this year at McMinnville, Ore. High School. As a freshman in her Algebra class she heard her teacher, W7SYB, talking about starting evening classes in radio. Nancy talked Linda into joining with her, got her license in May of '56 and was ready to go on the air with a 50 to 75-watt rig she built with her teacher's help. Using an NC-98 and a 250-

W7TQR, Georgia Doll, age 17.

WN7EHX, Patsy Wright, age 13.

W7AUO,
Barbara Demke,
age 13.

ft. Windom antenna she has been on 80, 40 and 15 meters. She checks into the Pacific Teen Age Net, the Oregon Emergency Net and the state CD net.

WN7EHX, Patsy Wright, age 14, has just finished the 8th grade at Irving Junior High School in Salt Lake City, Utah. Patsy came up with her Novice license a year ago this month and since then it has been a real tug of war between homework and ham radio. In the February Novice Roundup Patsy worked 10 new States and made 2573 points gained by 31 sections plus the 15 wpm CPC. She uses an xtal on 3595 or 3578 with 50 watts in a rig her dad, W7POU, built. Pat plays the accordion and has been on TV with two professional accordion groups.

WN7FHF, Nina Jane Overstreet, 15 years old, of Ilwaco, Wash. will be a sophomore this year in high school. Her dad is W7EEX.

W7QWX, Mary Klock, 17 years old, of Troutdale, Ore. has just completed her senior year at Corbett High School. Mary's dad, W7NGG, inspired her to take up ham radio and she got her Novice license when she was 12 years old. Her brother is W7QOJ. Operating exclusively on 10 meters, W7QWX uses a home-built 50-watt rig, an S-40-A receiver with a VHF-152A converter and a 3-element close-spaced beam. She also is an operator for her community CD station. Mary will attend Oregon State College and plans a career in fashion co-ordination. Other hobbies include music (piano and marimba), growing roses, and 4-H club work. She won an expense-paid trip to the 1956 National 4-H Club Congress in Chicago and represented Oregon in the national finals of the "Make It Yourself With Wool" contest at Las Vegas, Nev. in Jan. 1957.

W7TQP, Carol Dugan

W7TQR, Georgia Doll—These two 17-year old YLs of Casper, Wyo. have just completed their junior year in high school. Both received Novice licenses while in the 7th grade after receiving instruction from their teacher, W7HYW, and in March '54 dropped the "N" from their calls. Both were active using equipment they built with the help of their teacher. Dur-

W7TQP, Carol Dugan
age 17.

ing the last two years Georgia has spent more of her time on school and other activities. She is a National Honor student and a delegate to Wyoming Girls' State, vice president of a girls' club and a member of many of the school-sponsored clubs.

W7TQP, Carol, is now running 350 watts with a 6146-813, using an HRO-50 receiver, a one-element beam and a folded dipole. With these on 20 cw she has worked 110 countries in less than a year. She also has WAS. Other activities include two 4-H clubs, debate class, Casper ARC, and several school-sponsored clubs. Both Carol and Georgia are planning on college and careers in engineering.

W7UOH, Sharon L. Pakinas, 11 years old, is the daughter of W7UOI at Bothell, Wash. Sherry received her Novice license when she was 7 years old and now holds a Technician's. She and her dad use a homemade rig, an HRO-60 receiver, with a long-wire antenna. Other hobbies are Campfire Girls and horses.

W7WOT, Sherry Nicholson, age 17, has just completed her senior year at the Bellingham, Wash. High School. Sherry got her Novice ticket at 14 in Aug. 1954 and her General that November. Since then she has worked mostly on 20 and 75. She checks into the

Pacific Teen Age Net (3815 kc 4:15 p.m. PST). The rig is a home-brew job (her dad is W7SJL) running 600 to 800 watts and the receiver an SX-71. Other interests include bowling, swimming, skating. She is planning to attend Washington State College.

W7WSU, Patricia L. Hart, 15 years old, has just finished her junior year at the Upper Columbia Academy at Spangle, Wash. It was her dad, W7GHY, who got her interested and she received her Novice ticket in Aug. 1954, when 12 years old. As a Novice she worked 24 States, KL7, KH6 and several VE districts. Pat's home is at Troy, Idaho so when she is in school she and her dad keep twice-weekly skeds, which Pat finds an ideal way of saving postage and letter writing! Her rig is a DX100 with an NC-100A receiver which she has used on 75 and 160. This summer she is operating 10 and 20 also. At school her station is used in the CD program. Pat's other hobbies are photography and writing.

W7QWX, Mary Klock, age 17.

W7ZLT, Sherry Jorgensen, 16 years old, has just completed her sophomore year in the Bend, Ore. Senior High School. Sherry got her General license in April '55. Her older brother had his call, W7SBR, several years before and this interested the rest of the family. Now they all are licensed—W7ZLR, her dad; W7ZLS, mother; W7ZLU, younger brother. They took theory and code lessons from Carl and Bea Austin, W7GNJ-HHH, twice a week and also worked at home with brother Alan. Sherry helped to build her own transmitter, but at present is sharing her mother's rig which she uses on 75 phone and 80 cw, with an HRO receiver. In the family also is the CD rig for Deschutes Co. Sherry plays flute and piccolo in the school and city bands and enjoys sewing.

W7ZLT, Sherry Jorgensen, age 16.

W7WOT, Sherry Nicholson, age 17.

To all of these young YLs, hearty congratulations. May there be many more teen-agers, and younger, who join our ranks! Any other young YLs in the 7th area we may have missed, let's hear from you, Next month we'll include those from other parts of the country.

Our sincere thanks to W7NJS, Beth Taylor, 1956 7th district D/C for YLRL, for her help in gathering this material.

● ● ●

To assist those wishing to earn their Lad 'n' Lassies Certificate, members of the Los Angeles YLRC will be monitoring 20 cw and phone every Wednesday during July. Call "CQ LAYL" at 1500 PDT on 14,095 or 1600 PDT on 14,250.

33, Louisa, W5RZJ

W7WSU, Patricia Hart, 15 years old.

New CQ Guessing Game

Our lucky non-subscribers will be able to participate in a new game next month. We are changing our magazine distributors as of the August CQ. We challenge you to find out where the CQ's will be next month. If you don't want to play just send $$ and we'll put you on our mailing list. Fair enough? See page 125.

RTTY

Byron H. Kretzman, W2JTP
16 Ridge Drive, High Hills,
Huntington Station, N.Y.

VFO Deluxe. This is the feature of your RTTY column this month. FSKing a VFO can be a fairly simple matter, as you have seen in the Heathkit VFO modification described in this column in the November 1956 issue of *CQ*. That is a fine circuit for the newcomer or for the fellow who likes to work just one band, sticking around the same frequency, and using just one amount of shift. After a fellow has been on RTTY for a while he sort of gets the urge to try greener pastures. (You know the grass is always greener in the other guy's antenna farm.)

This VFO is the result of the urge of Jack Pitts, W6CQK/2, to build something that would make his RTTY operation just a little smoother. A gander at the accompanying photos will convince you, too, that Jack has done a terrific job of construction. (RTTYers *build*.)

Look at the schematic diagram. Complicated? Not really. This is a *heterodyne* exciter. Of course you know how a superhet receiver works. Well, this VFO works in very much the same way. The mixer stage is called a *balanced modulator*. (Seems to me they use something like that in SB, don't they?) The *h-f oscillator* and the *i-f oscillator* are mixed in the *balanced modulator* which drives the *amplifier* to output on 80-meters. This is the basic arrangement.

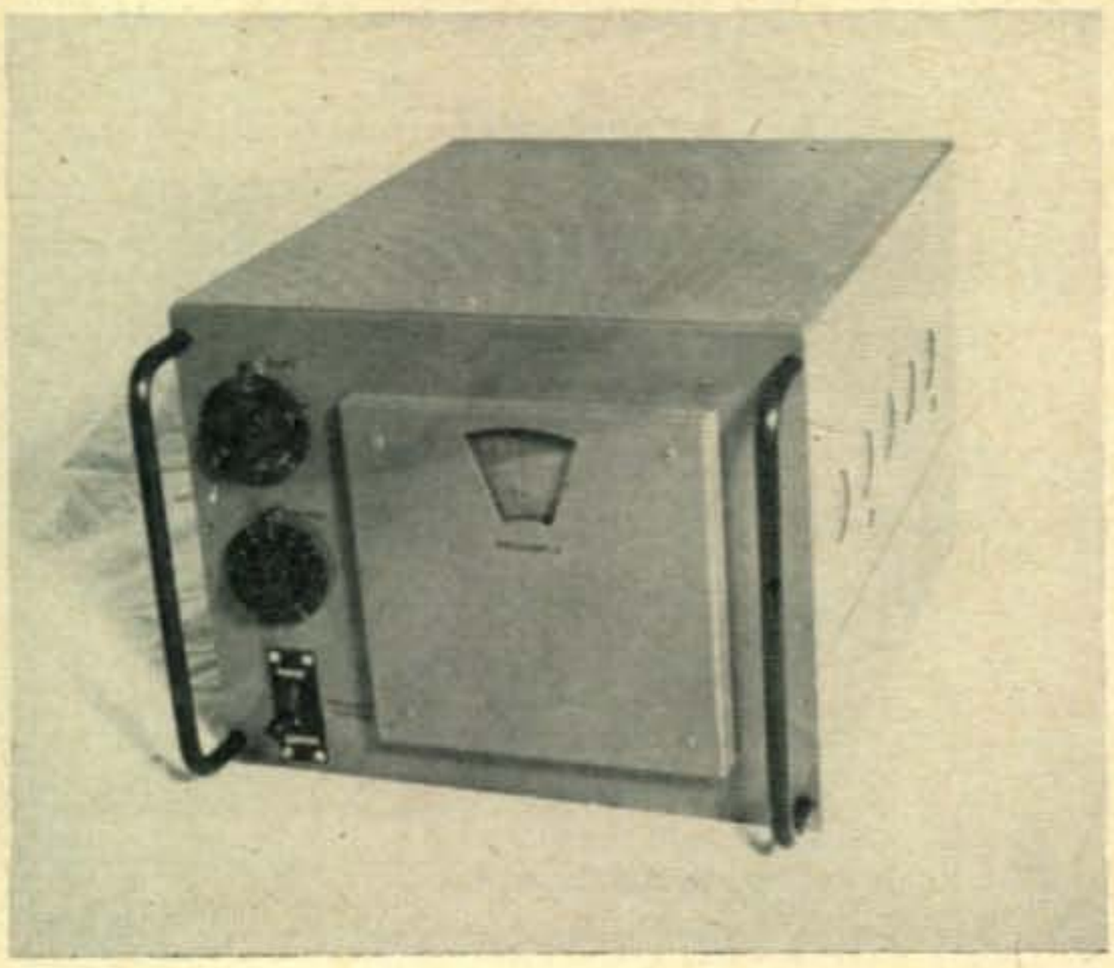
Now, for further identification: The *h-f oscillator* is the actual VFO. It always operates 200 kc lower than the output frequency of the exciter. (This is because its output is added with that of the *i-f oscillator*, the one that is shifted for fsk.) The *h-f oscillator* and output circuits of the *balanced modulator* and *amplifier* are gang-tuned to assure reasonably uniform output all across the 80-meter band. The *v-t keyer* stage is simply a convenient way to key the Class-A *amplifier* stage for cw operation. A potentiometer in the screen circuit provides a simple but effective way to adjust the power output to the value desired by the transmitter.

When you look at the front of this exciter you get the feeling that something is missing. What the heck is it? Let's see: There are only two knobs, one marked SHIFT, and the other marked OUTPUT. Wait—there is no knob for the dial! A telephone-type key lever switch is used for FREQUENCY CONTROL, with the up position marked RAISE, and the down position marked LOWER. You guessed it—this VFO is *motor* tuned!! The tuning motor can be controlled either by the panel switch or by a pair of relays.

Why go to all this trouble just to have a VFO to use on RTTY? Well, first of all, it was desired to operate the VFO remote control over a leased telephone line, together with the other usual functions of transmitter operation such as a-c control and carrier control. Details of just how this is done is an article all by itself, so I won't go into *that*, here.

The *balanced modulator* is used to insure that the output of the *h-f oscillator*, sometimes outside of the band, does not get out to the transmitter. A screw-driver-adjust control on the back of the unit permits balancing this stage for minimum output. Note that the *h-f oscillator* is fed in parallel to the *balanced modulator* input grids, while the output plate circuit is in push-pull. The output of the *i-f*

W6CQK VFO, Front View



oscillator is fed in push-pull to the injection grids of the *balanced modulator*, but 200 kc is so far from 3800 to 3900 kc that there is plenty of rejection.

Frequency shifting is done to the *i-f oscillator* by the *frequency modulator* for several reasons. Stability comes easier at 200 kc, and since this frequency is added to the *h-f oscillator*, what infinitesimal drift there might be is added instead of being multiplied as in the usual VFO. Also, no matter where the VFO is tuned, the amount of shift remains constant once set by the SHIFT control. The SHIFT control, by the way, is calibrated for 850 cycles, 425 cycles, 212.5 cycles, and 106.25 cycles. Its setting, of course, depends upon the particular band in use at the time, or in other words, how much multiplication is used in the transformer.

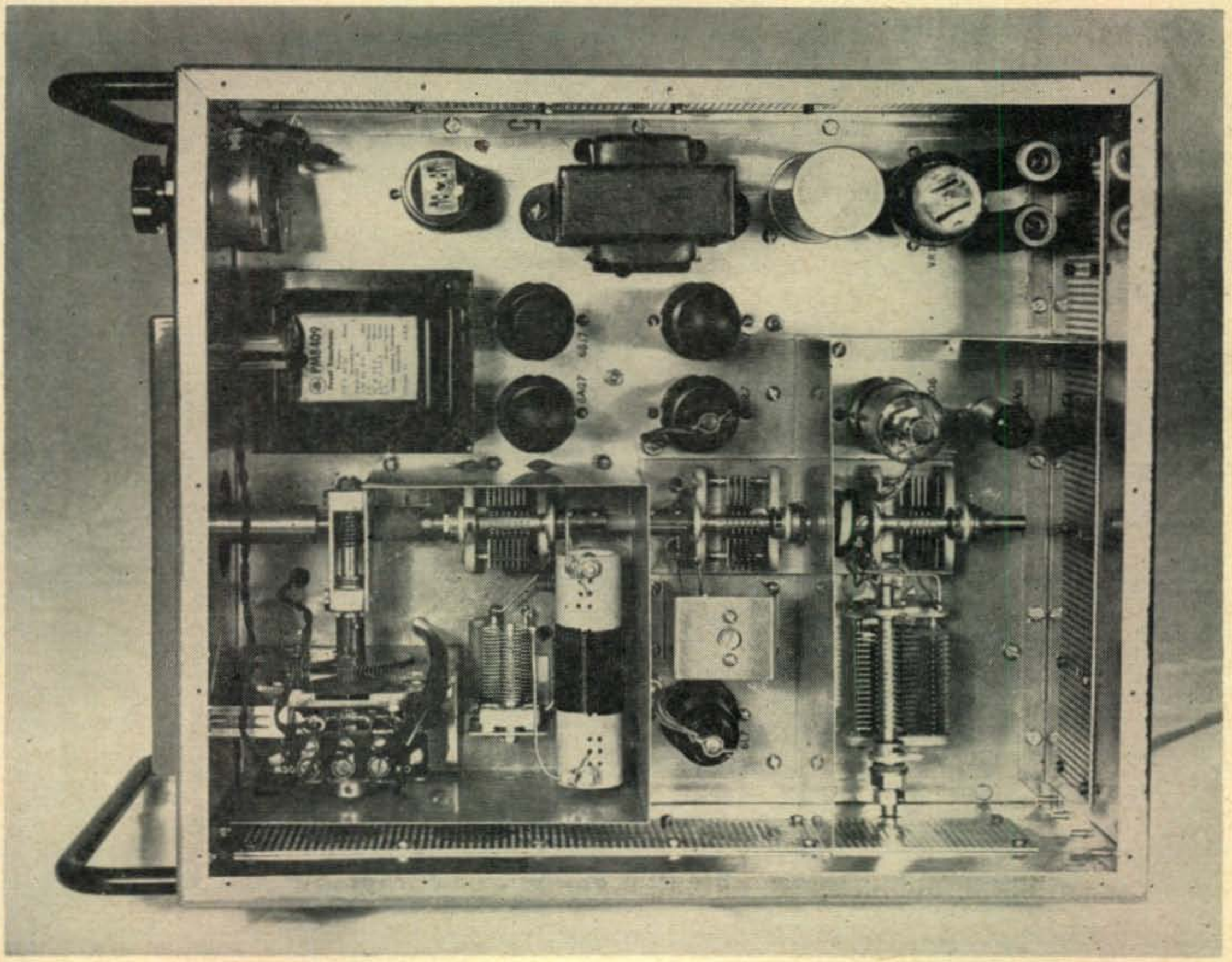
Nothing really special, that cannot be easily duplicated, is used in this VFO. The worm-gear drive for the ganged tuning capacitors was salvaged from a "command set." The *WE* 4-400B rectifiers used to get bias for the *v-t keyer* tube can be substituted for by either selenium or silicon rectifiers. They should each have a voltage rating of about 130 volts and a current rating of at least 5 ma. The power transmitter is a *Stancor* PM 6409.

Tracking of the ganged stages is not especially critical, and it is accomplished by adjusting the end turns on the *balanced modulator* plate coil and by bending slightly the end plates of the variable capacitors in the tuning gang. Adjustment of the *balanced modulator* balance control is done with aid of the S-meter on a communications receiver. The receiver is very loosely coupled to the output of the exciter and is tuned to the output frequency of the VFO minus 200 kc. The balance control is then turned with a screw-driver until minimum S-meter is obtained. The toggle switch on the rear is thrown to the BAL position for this adjustment in order to kill the 200 kc oscillator to simplify identification of the *h-f oscillator* signal in the receiver.

2-Meter FSK

Remember, back in the May, 1956, issue of *CQ*, in these pages, we told of preparations being made for *fsk* operation on 2-meters? Stations mentioned were W1FZJ and W2SMX. No report was available from Sam, but John, W2SMX, invited your RTTY Editor over for a look-see and a coke.

W6CQK VFO, Inside Top View.



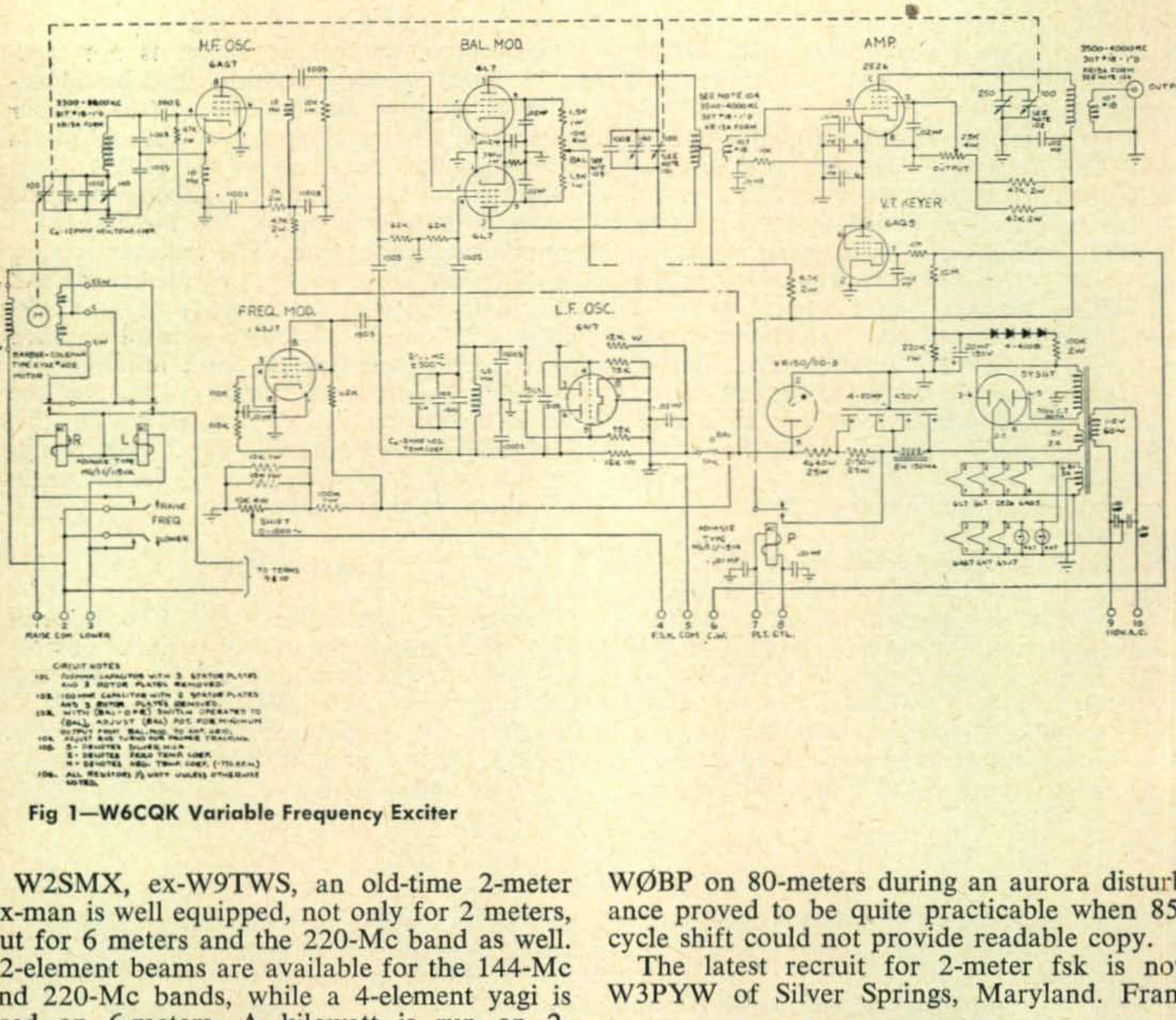


Fig 1—W6CQK Variable Frequency Exciter

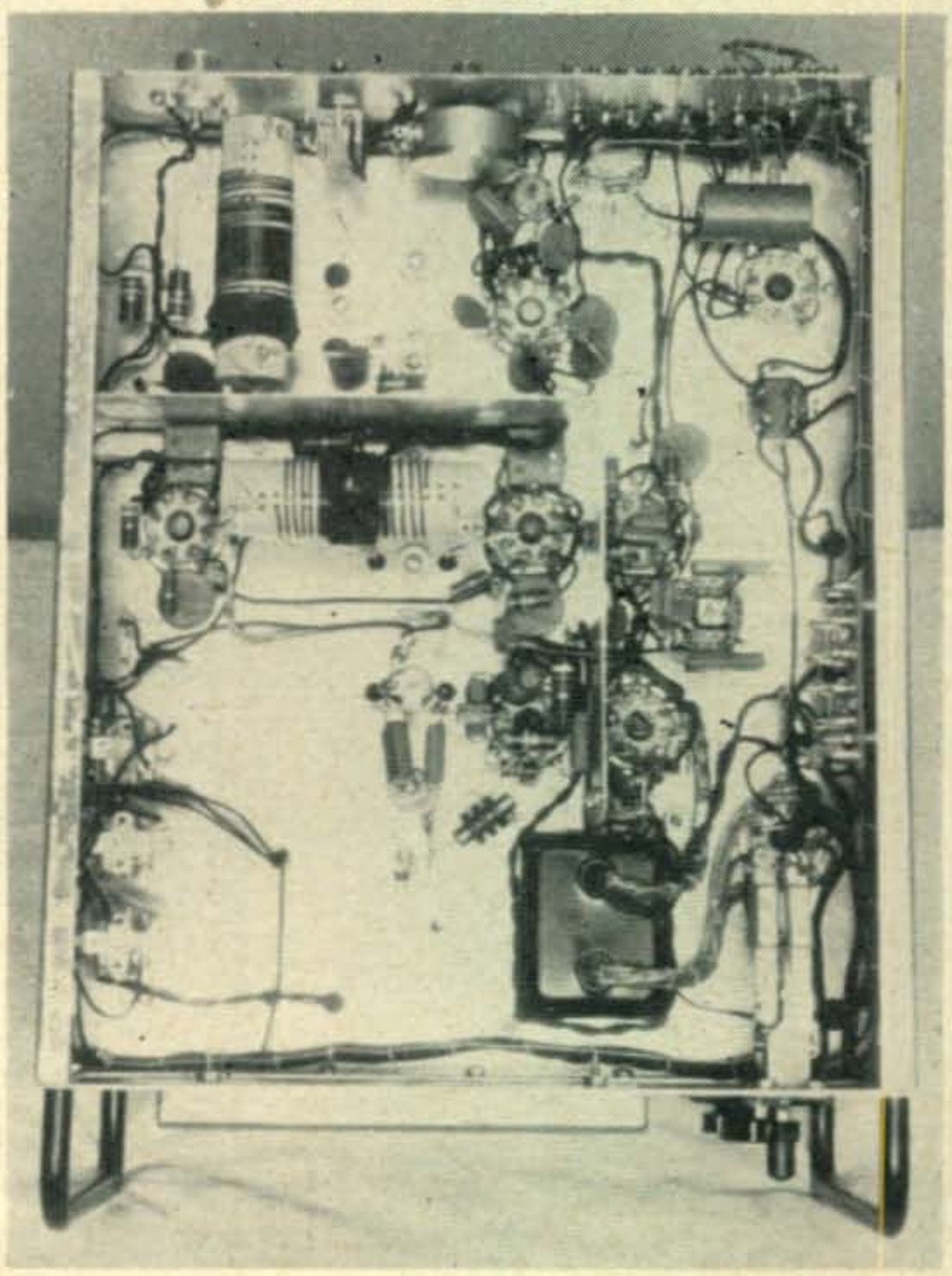
W2SMX, ex-W9TWS, an old-time 2-meter dx-man is well equipped, not only for 2 meters, but for 6 meters and the 220-Mc band as well. 32-element beams are available for the 144-Mc and 220-Mc bands, while a 4-element yagi is used on 6-meters. A kilowatt is run on 2-meters, 500 watts on 220-Mc and 100 watts on 6-meters.

Receiving equipment consists of crystal controlled converters working into a 75A4, which feeds the FRA RTTY converter, i-f type, to drive the Model 26.

John has been trying to persuade other 2-meter dx-men to use fsk, even if just used with a hand key. He believes that an approximate 8-db advantage can be gained by the use of fsk. In addition, narrow-shift can be used for further advantage. A narrow-shift QSO with WØBP on 80-meters during an aurora disturbance proved to be quite practicable when 850 cycle shift could not provide readable copy.

The latest recruit for 2-meter fsk is now W3PYW of Silver Springs, Maryland. Frank

W6CQK VFO, Bottom View



Amateur Radioteletype Channels

National, FSK 3620, 7140, 27,200, 29,160, 52,600 kc.
National, AFSK 27.2, 147.96, 144.138 mc.
Area Nets:

California	147.85	Mc.	AFSK on AM
Chicago, Ill.	147.70	Mc.	AFSK on FM
Detroit, Mich.	147.30	Mc.	AFSK on FM
Washington, D.C.	147.96	Mc.	AFSK on AM
	147.495	Mc.	AFSK on AM
New York City	147.96	Mc.	AFSK on AM
Livingston, N.J.	146.30	Mc.	AFSK on AM
Buffalo/Niagara	147.50	Mc.	AFK on AM
Boston, Mass.	147.96	Mc.	AFSK on AM
Seattle, Wash.	147.00	Mc.	AFSK on AM
Spokane, Wash.	147.15	Mc.	AFSK on AM

was one of the early pioneers on afsk 2-meter autostart eight years ago. Frank says, ". . . I had a kilowatt, 10-element beam, and lots of unhappy nearby neighbors." The TVI and BCI was due to the amplitude modulation being detected in the first audio stages of the receivers. When fsk privileges on the lower frequency bands came through, this was "Escape!"

Now, the urge to do something just a little bit more with RTTY has moved W3PYW to set up for fsk on 2-meters. This, naturally, won't bother the neighbors like the old afsk.

So, there you are, you vhf men. There is your chance to take advantage of a new medium. Why not start with just hand-keying fsk? It is then just a short step to the keyboard and printer.

FCC Actions

Boyd Phelps, WØBP, got the FCC to clarify the question of the legality of non-licensed persons operating the keyboard of an RTTY station. This has been a question some of us ex-guard house lawyers have been debating for a long time. BeeP's direct approach to the problem resulted in a quick and satisfactory answer: ". . . when an amateur station is used for radioteletype the station licensee may permit any person to transmit radioteletype emission subject to the same conditions as prescribed under Section 12.28 for transmissions by voice. Where radioteletype tapes are used it is not necessary that they be prepared by the same person who uses them in making transmissions. It should be understood that, in any case where such emission is used, a properly licensed amateur operator must maintain control and must perform certain operating functions as prescribed in the aforementioned section."

By now, most of you should be familiar with Docket 11994, regarding the proposed deletion of the 11-meter band from the Amateur Service. I hope that all of you filed your comments before the June 10th deadline. If we lose this band ZL1WB is going to have some useless crystals, and Lansing, Michigan, is going to have to move its RTTY net elsewhere. (If there is anything that I really *hate* to lose, it's a frequency.)

Kleinschmidt

Back in the May 1957 issue of *CQ*, I asked if any RTTYers had any Kleinschmidt teleprinter equipment. So far just a few have replied that they have such gear or parts.

Tom Mead, KN9EVD, of Lake Forest, Illinois, has a Kleinschmidt page printer and is on the hunt for a TD. Tom is still confined to the Novice frequencies looking for that RTTY QSO. He would like to get on the Chicagoland FM net, but that is outside the novice portion of the band.

Lester Hammond, W6EV, of Los Angeles, California, writes that he is well stocked with parts, being in the surplus business. He has been on fsk for the past five years with a Model 19. As a post script, Les adds that he used to operate from Long Beach, Long Island, as 20A from 1912 to 1923. *(I told 'em and I told 'em; that there were old-timers in this game!)*

Riley Fowler, W4RRH, of Morganton, N.C., the SCM of North Carolina, is adding himself to the ever growing list of SCM's interested in RTTY. These fellows are recognizing the fact that RTTY is *the* way large volume traffic can be handled with speed (60 wpm) and accuracy. (*CQ*, August '56, p72; *CQ*, April '57, p63)

Across the Nation

A nice long letter from Bud, W6CG, and his XYL, Mary, K6OWQ, tells of their activities in Temple City, California. (In case you don't read the DX column, Bud just got himself a WAZ certificate.) Bud and Mary worked CN-8FQ and CN8JD on 20-meter RTTY. These were the first west coast contacts for the CN8's. Mary has been talking about WAC-RTTY ever since working ZL1WB. Bud says that he laughed at her then, but now he is beginning to wonder!

Jim Smith, W5TYI, of Alice, Texas, advises us that he has a Model 14 and a 14 TD. Jim is rebuilding his vhf rig for afsk and expects to be on 40-meter fsk in addition.

Phil Catona, W2JAV, of Hammonton, N. J., has been working 40-meter RTTY with a flea-powered *transistorized* transmitter. 20-meter operation is in the works, so more about this next month.

New stations showing up around 3620 kc here in the east are, K2HHH of Westfield, N. J., W2KDW of Irvington, N. J., W2LRW of Schenectady, N. Y., and W1ZXA of Central Falls, Rhode Island.

Comments

My comments regarding CD and RTTY, or the lack of it, (*CQ*, May '57, p73) seems to be stirring up a hornets' nest, or maybe it's shaking loose some of the lead. Did you ever listen to some of those CD 'phone nets handle traffic, with medical reports, for instance? Between repeats and fills it comes out to something like *2* words per minute. No, the printer didn't leave off a zero—I said 2.

For some tests in an eastern city, a wire service *loaned* printers to CD for RTTY. These machines, without any modification what-so-ever, were looped into the polar relay circuits of afsk gear of the local RTTYers. The terminal units were on loan, too. Conventional CD 2-meter transmitter/receivers were used. It *can* be done, one way or another. Can't we get with it?

73, Byron, W2JTP

DX

R. C. "Dick" Spenceley, KV4AA
Box 403, St. Thomas,
Virgin Islands

Our heartiest congratulations go to the following stations upon their achievement of WAZ:

No. 345	HB9X	OTTO BAUMANN	40-227
No. 346	W7RT	JOHN GRUBLE	40-210
No. 347	ZL1HY	DAVE BROWN	40-163 PHONE

HB9X is the second WAZ for Switzerland, completed by a QSL from AC4RF, while W7RT is the 20th W7 and was pushed over the mark with a pasteboard from HS1A. Dave, ZL1HY, deserves special mention for the first Oceania PHONE WAZ completed by a card from UAØKQB!

We also welcome the following as newcomers to the HONOR ROLL:

W5ABY, Ken,	39-228	W8KZT, Len,	37-164
G3FXB, Al,	39-222	W9VL, Lou,	36-122
G3FKM, John,	39-207	W1YNP, Bob,	35-136
JA1CJ, Hiroji,	39-186	K6OPI, Bill,	35-97
SM5CCE, Kjell,	39-162	G3FXB, Al,	36-167 (phone)

DX Notes

Good news is supplied by Robbie, VQ4ERR, who states that VQ9HAY is now active from Mahe in the Seychelles Islands. He will be there for two years. VQ9HAY is a new ham, name: John Haywood, and operates a "B2" rig, 15 watts, on cw. He is somewhat self-conscious about his QRS at present but it is hoped, in time, he will be inoculated with the hobby cw-wise to the mutual satisfaction of the thousands who will be after him. His present adherence to cw is due to the fact that no phone is available. VQ9HAY is also very keen on sailing and travelling and he has promised, when visiting any of the islands, particularly Aldabra or the Amaranti group, to take along the rig and a 6 volt battery. As extreme portability is necessary only low power can be used if these trips are taken. This QTH seems deserving of a better transmitter and steps will be taken to provide John with a rig of the Viking Ranger variety.

Further word comes from VQ4ERR, dated May 2nd., advising that gear, donated by REF hams, has arrived in Madagascar, and will be forwarded to FB8CD, on the Comoro Islands via next ship. Thus, FB8CD, may have been heard by now.

I1FO reports that I1ZCT and I1MAB were due to operate from Monaco from May 30th to June 7th using the call of 3A2BG.

ON4CC will be on from Luxembourg, using sideband (near 14308), August 15th to 19th. (Tks W2YEJ)

W2HWA heard M1H on the high end of 14 CW giving QTH as Box 80, San Marino.

UN1AB says that expedition to Tannu Tuva will take place during the latter two weeks of July. A 100 watt rig and HQ-129X receiver will be used. He further states that there is no activity from Franz Josef nor Wrangel Island and none anticipated.

VK2AGH reports activity from FK8AT on Lifou Island, of the Loyalty Group. He is OK for DUF and is on 7 mc at present. Will be other bands later.

DL4CLM (KØDXE) is also licensed as PA-ØDXE and may appear as LX1DXE soon.

KØDEX reports hearing EP3SS on 28 cw. It seems that this is an American over there and not to be confused with DL3SS who is the

Snapped at VQ8AH, during the occasion of FB8BP's last visit to Mauritius, are (l to r) Jack, FB8BP, Volcy, VQ8AF, Leny, VQ8AB/VQ8CB and Leon, VQ8AL.
(Photo courtesy VQ8AH)

Valen, UO5AA, of Kagul, Moldavia is a popular catch and quite active.
(Photo courtesy DL4RI)

Danny, VR1B/VK9TW/VR4AA, during a recent radio appearance in St. Louis, at CBS's KMOX.
(Photo courtesy WØANF)

Iranian Ambassador to Germany and who had hoped to be on from his home QTH some day. KØDEX also reports that his plans for a DX'-pedition to KS6, American Samoa, are progressing favorably.

The proposed trip of KP4JE and KP4KD to the British Virgin Islands has been called off due to KP4JE's transfer to W6-land in May.

OH3TQ advises of another expedition to the Aaland Islands. This trip will take place between June 23rd and 30th and the call OH3AA/Ø will be used. Two, all band, fifty watt transmitters will be used and the four operators: Topi OH3OD, Martin OHRRA, Kake OH3TQ and Heikki OH3UO will attempt to operate them continuously. Phone and CW will be used with transmitting frequencies being around 28050, 21050 and 14050 (plus 7 and 3.5 mc), on cw, and lower sections of phone bands. Stations are requested to call in from 10 to 20 kcs up from transmitting frequencies. QSL's go via OH3OD or OH3RA. This trip is sponsored by the Hameenlinna Radio Club, OH3AA.

LA4DD, who planned Spitzbergen jaunt, advises that trip is off due to impossibility of obtaining transportation.

G3AAE will run 25 watts from the Channel Islands, signing GC3AAE, from June 5th to 19th. Hope you got him—.

VP7BN (W2MNN), now on Mayaguana Island, Bahamas, leaves for Ascension Island, ZD8, between Aug. 1st and Sept. 15th for a two year stay. He hopes for ZD8 call altho it doesn't look like they are handing them out to Americans very freely!

LAIVC/G, in Norwegian Antarctica, will be active until March 1959.

W2AGW is trying to set up things for a party who will visit Nepal in October!

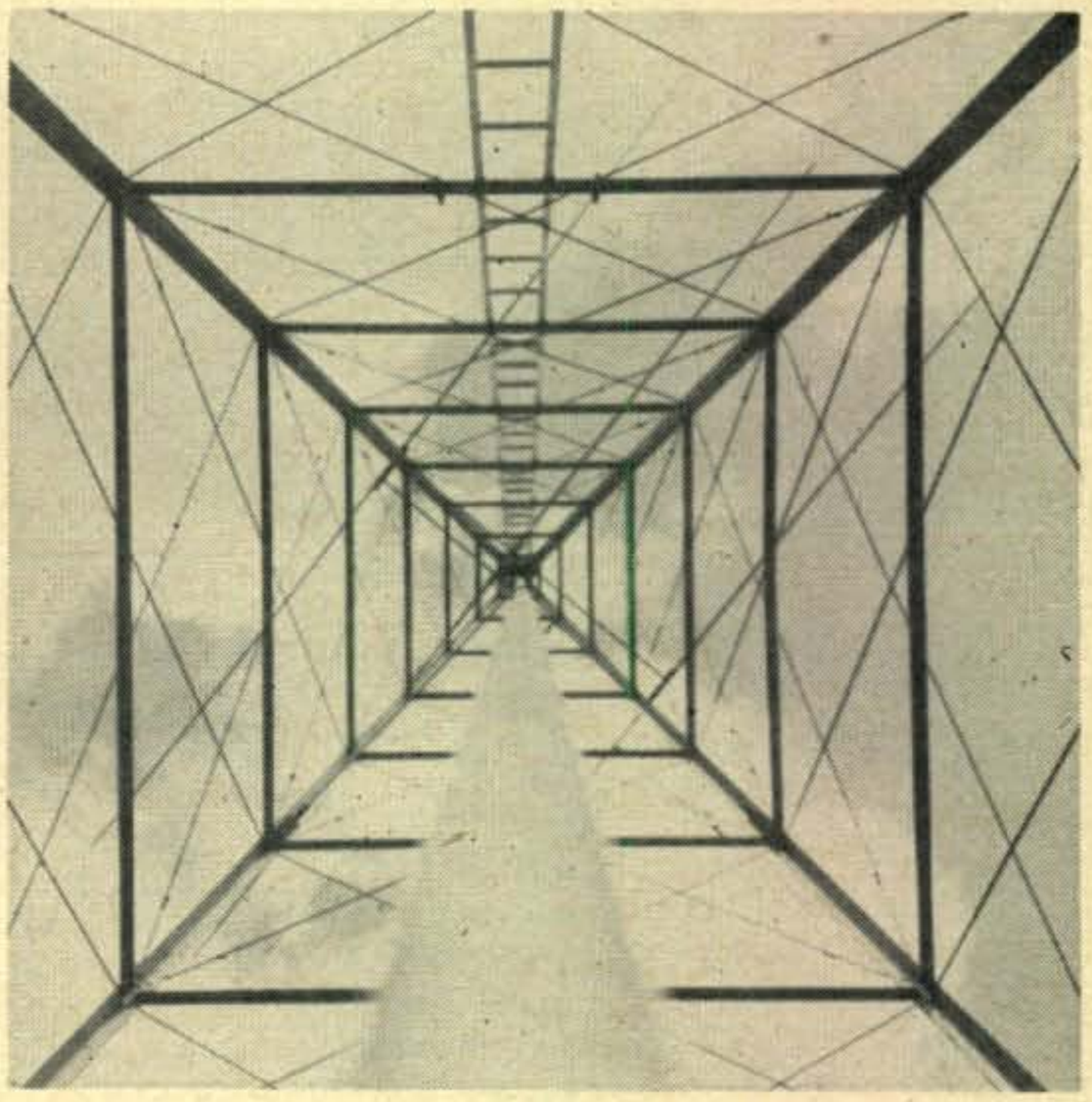
Doug, K2UUT, ex-K9BJQ, wishes it known that he will operate from Canada's Prince Edward Island during the period July 24th to 27th. He will be assisted by his XYL, Mary Lou, KN2ZLN. The call K2UUT/VE1 will be used. Operation will be on both 14 and 7 mc, phone and cw, on the approximate frequencies of 7040, 7220, 14050 and 14170. A DX-100 rig plus NC-88 receiver will be used. Contacts with Prince Edward Island are necessary for the Canadian WAVE award.

ZB2Q has now gone QRT and may be heard as G3LQI (Tks W9SZR).

VK3CX says activity due from CR8-land for the first two weeks of June but no details——!

George, ET3GB, advises that he is on the air again and may be found near 14004 around 1800 GMT. Phone activity awaits new modulation transformer. ET3GB will QSL 100% if sent an IRC. One if by sea and four if by air. See QTH's.

Pat, ZC5JM, reporting via letter to K9BVR, says: we run about 60 watts to a 6146 final here at ZC5JM and some of the other boys, such as ZC5GL and ZC5DA, use it as well.



Worms-eye view of new 61 foot VESTO tower at KV4AA.

The antenna is a G5RV multi-band dipole. QSL'ing is rough as the P.O. here will not accept IRC's. I may go back to VS1-land in April or be lucky and remain here until I go home in August. I hope this Club will keep

From an Editorial in the excellent JDX-RC Bulletin edited by JA1CO we quote:

It has come spring DX season! so let us hunt nice DX. To itta tokorodesu. Sonohoka typewriter no sikin mo member no tikarade sidaini masite imasu, mohitoiki ganbatte kudasai——By Exertion, By Exertion and endeavour!! ——(We'll be in there punching too, Miyao)

going after I leave but it's "all in the stars."

Bill, W6OUN, advises that he has recently forwarded a stack of HKØAI QSL's to the various bureaus—mostly 1954/55 QSO's. Bill also received a log from "the real" ZK2AB covering QSO's made between Jan. 2nd and 17th 1957. Here they are: JA5CP, W9BPW, K6AH, JA6FB, KR6RY, JA7BO, VK9XK, LW8ZC (?), VK7CH, W3DRD, LU3ZS, ZL3-CP, VK2ARV, PY2AL, W8WHC, ZL2FA, JA8AQ, W6AGO, W6NZS, W6AWT, W6HZN, W6KJS, K6LZI, K6AYA, W6YMH, W6RAN, VK2HQ and W6GIZ . . .

W4CEN reports that VS9AI continues activity on 28, 21 and 14 phone and CW and that VS9AD has been reactivated by the RAF boys and is also on the air.

Ex-VK1IJ will go to the Mawson Antarctic Base as VKØIJ. VKØAB is ex-VK1AC, Chas, in Princess Elizabeth Land and gives his position as 68.34 South and 77.56 East. VK2EG handles his QSL's which have already been printed.

Fred, VP2LU, St. Lucia, Windward Is., with over 5000 contacts behind him anticipates about six months more activity from that QTH and then considers transfer to Fernando de Norhona and a PYØ call, especially if it is accorded separate country status (We think that's sure Fred. It's about 300 miles from the mainland). Otherwise he may go to Antigua in the Leewards.

West Gulf Bulletin Notes

(W7MBX)-AC5PN operates on Sundays at 1200 GMT on 14100 and will QRO to his BC-610 soon . . . (W7PHO)-JZØPC was due to QRT in May and will head home for Ireland . . . KC6SP also going QRT but another fellow will take his place . . . (VK5AB)-VS4JT, Sarawak, is putting up beam for 14 Mc . . . No VK8 calls have been granted. The following stations are in Australias Northern Territory: VK5AE, VK5AL, VK5BV, VK5EW, VK5LJ, VK5LZ, VK5MQ, VK5SB, VK5ST, VK5TL, VK5UG and VK5VG . . . (K5ABW)-KG61G, Bonin Islands, is usually on around 1000 to 1300 GMT on Sundays and Mondays near 14061 kc . . . (W5ALA)-CR1ØAA now has new rig and receiver and hopes to be more active soon . . .

Bill, W1JMI, will visit W1OAK and W1MMN in VERMONT for a week starting July 15th. He will attempt to dispense as many needed Vermont QSO's as possible. Rig will run 300 watts and receiver is a 75A-3. Mostly CW on 7 and 14 Mcs. Some phone. All DX contacts will be QSL'd via bureaus. W's please sent stamped, addressed, envelopes.

Pete, G3ESY, advises as follows: If anyone wants the rare County of HEREFORDSHIRE I am on 14 mc cw most mornings from 0500 to 0700 GMT. G3ESY seeks Utah and N. Dak. for WAS. (0500 to 0700 British Summer Time after April 14th)

Comments from Viet-Nam

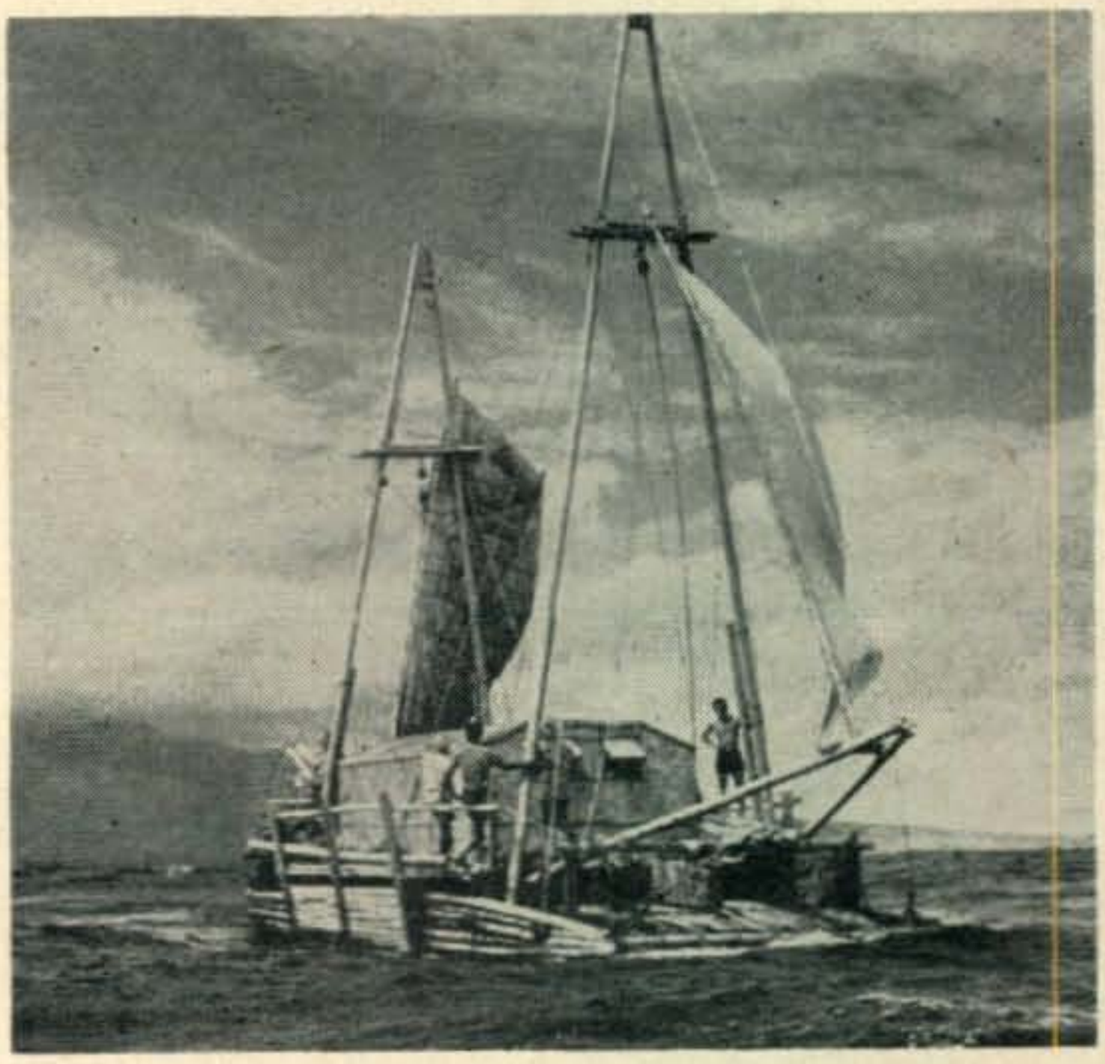
L. M. Rundlett, W3ZA, ex-KV4AD

On my way to Saigon I stopped off at the home of Doug, G3AAE, where I also met Alan, G3ANK ex-VS9AS, G3KZI, G3IMV and G3YF. Had a very nice visit and collected

Frank, W6SYG, receives the "Outstanding DX-er of the year 1956" award from South California Prexy Art, W6MUB.

(Photo courtesy So. Cal. DX Club)

This is a shot of the raft "Tahiti-Nui" (Michel Brun operated FO8AP/MM) before it broke up in the South Pacific.



my long awaited VS9AS QSL from Alan. On arrival in Bangkok I spoke over phone with HS1MQ who verified the existence of HS1A and HS1B. Tried to locate HS1B but no dice. Altho licensed the HS gang seem to be quite elusive. Perhaps a hangover from undercover days. I arrived in Saigon on schedule (April 16th) and found my 75A-4 waiting for me so

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COMMUNICATIONS MONITOR RECEIVERS*

This new series includes models for effective monitoring of FM or AM transmissions in the VHF ranges in regular use by aircraft, airports, police, fire, taxis, trucks . . . also municipal, commercial and military services.

Following a long established Gonset practice, each of these receivers is a complete, ready-to-operate "package". AC power supply and speaker are built in with provisions for external speaker. (Or external-internal speakers simultaneously.) Rear connector accommodates plug-in indoor antenna or supplies connection for outdoor type.

Receivers are contained in all-metal cabinets, are same general size and appearance as Gonset G-66B with Hammertone finish replacing the polished chrome of the latter. Dial is full-vision, slide rule type and has calibrated and logging scales.

All receivers have RF stages, feature excellent sensitivity, good signal-to-noise ratio. AVC systems are designed to cope effectively with strong signals from near-by mobile units. All receivers comply fully with FCC requirements for low receiver radiation.

Highlights...

SIZE: 6½"w, 4½"h, 10¾"d.

POWER: 105-125V AC, 60 cycle.

Eight tubes plus rectifier.

Adjustable squelch.

Automatic noise limiter. (AM)

Temperature compensated oscillator.

Audio output, 2 watts. (approx.)

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Meets FCC low radiation requirements.

Model 3155.... 30-50 mcs..... FM

Model 3156....112-132 mcs.....AM

Model 3158....152-174 mcs..... FM

all models.... **79.50**

*(to be available during September 1957)

For further information, check number 62 on page 126.

GONSET

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I hooked it up to see what could be heard. Antenna was just a coil of twin lead that wasn't even unrolled but you should have heard the JA's, KR6's, VS1-2 and 6 roll in, plus BV1US. A typical evenings tuning on 14 mc from about 1030 to 1300 GMT turns up such stuff as this, sans antenna: AC5PN, VU2AJ, VU2AX, BV-1US, VQ6LQ, KR6QW, 4X4JI, UAØKKB, 4S7WP, UL7KAA, UA9YN, 3W8AA, UAØ-KKB, UAØKCA, DU7SV, VS2ET, OQ5RU, KR6SS, VQ4MHA, UAØKVB, UA9YE, ZC-5AL, VU2AS, VU2RT, VS2DW, UAØVW, VS6DN, DU9JO, UB5CW, VKØAB, UF6AC, UAØJF, UI8KBA, UAØKAD, JAØFZ, UAØ-KUA and VS1HC. On 14 phone: KR6SS (SSB), VS2DW, KR6AF (SSB), VS1GR, KA2-NY (SSB), KA2YA (SSB), KR6MB (SSB), KR6QI (SSB), XZ2SS and VS2EK. 21 mc is not so hot but I copied JZØPC, 3W8AA, YA1-AM, UQ2KAA, KH6AIK/KG6, HA5BI, UB-5KAA and VK4DP at one period. Nothing on 28 or 7 mc without an antenna. You will note that W's, VK's and most Europeans are conspicuous by their absence. I am sure a good antenna will bring them through but the JA stations have such terrific signals that they will clobber anything else on the band. Last night I could have sworn that 3W8AA was right here in Saigon, his signal at 11 PM local time on 21 mc was 599 plus but tonight he is only 569 so guess he is in Hanoi OK. I think I am going to like it here as the weather is not too hot and this is the hottest season. It is more comfortable than Washington or Charleston in mid-Summer and the nights are fairly cool. I have a swell furnished apartment with air-conditioned bedroom. I still can give no info on my own future activity but I hope to have permission to operate in six weeks or so.

(May 9th) Just a note to let you (KV4AA) know I am hearing you everyday (1115 GMT) with an average S6 signal. Can usually copy solid except when "locals" such as UAØKJA or DU7SV smother you (KV4AA has been broadcasting "blind" for reports). Herewith are some more "calls heard." I don't think the QRG's are too important due to general use of VFO's so will just put the time. Heard HL2AJ on A3 the other night. He says he is one of the two licensed HL stations. He is located at the National University in Seoul and says they have five operators. This may mean that another one may soon come out from under the "ban." Let's hope XV will be next. I am enclosing a letter which was delivered to President Diem just before his departure for the USA. He was definitely interested and said he would ask questions about it while at the White House. Action is expected upon his return around May 30th.

Michigan State University strongly recommends the granting of amateur radio privileges to Vietnamese citizens and friendly foreign nationals. The control and regulation of such privileges to be in the form of licensing and to be under the jurisdiction of the Director of Telecommunications. Such a step will aid in building a large reserve of trained men and equipment to provide skilled technicians in time of war and emergency radio nets to back-up police and civil communications in time of national or local disaster. This program has been discussed with high ranking Vietnamese police officials and has been praised as a progressive move.

Amateur radio privileges are enjoyed by more than 200,000 persons in every country in the world, including iron curtain countries, except South Viet Nam, Cambodia, South Korea, Indonesia and Iran. In the United States, radio amateurs have a long and proud history of public service in time of national and local need. Many men in high places are members of this great fraternity. For example, former U.S. Under Secretary of State, Herbert Hoover, Jr., Royal Princes of Saudi Arabia, a Prince of Sikkim, General Curtis Lemay, Commanding General, Strategic Air Command, even President Eisenhower, altho not himself a radio amateur, permits the operation of an amateur radio station at the White House and aboard the presidential train by members of his signals detachment. Should you wish to make inquiry while in Washington, Mr. Al Hart of the White House signals detachment is in charge of this activity.

In order to facilitate our work of equipping the Civil Police with a modern communications system, we request that you immediately grant temporary experimental amateur radio station and operator privileges to Mr. Lyman M. Rundlett, Police Communications specialist on our staff. In connection with the planning of radio facilities, it is necessary to test circuits and frequencies within and to points outside South-Vietnam. Tests to points outside Vietnam can most readily be accomplished through the use of amateur radio facilities.

The predecessor government in Indo-China placed a formal notification with the International Telecommunications Union in Berne, Switzerland to the effect that it did not permit amateur radio operation and requested member countries to warn their operators not to communicate with any stations in Indo-China. Since the Republic of South-Vietnam is now a member of International Telecommunications Union, we suggest

1—that you advise the Union that the present government has no objections to its licensed amateurs communicating with licensed amateurs of other member countries and,

2—that it has no objection to the exchange of third party communications, of such nature that they would not normally be transmitted over commercial facilities, between the radio amateurs of South-Vietnam and those of any other country permitting similar

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For further information, check number 27 on page 126.

communications.

We further suggest that you notify the Ambassador of the United States of America in Saigon to the effect as set forth above and specifically as to the privileges granted Mr. Rundlett.

In connection with our radio tests to points outside South-Vietnam, it is intended that our personnel be permitted to talk with their families in the United States for morale purposes, also, to the maximum extent possible these facilities will be extended to Vietnamese students in the United States for the same purposes. Radio telephone facilities between Saigon and the United States are not presently available and in any event would be too costly to be used for this purpose.

We regret that time does not permit establishing this facility for your convenience during your forthcoming visit to the United States. Soon after your return to Vietnam, Mr. Rundlett will be prepared to demonstrate amateur radio to you and to set up a facility at the Palace for your personal convenience, should you so desire.

A broad outline of a training program built around amateur radio operation is attached for your approval.

PROPOSED

Radio Training Program for Police Forces

I—*Objective*

To train a large number of Vietnamese police officers in the operation and maintenance of radio communications equipment.

II—*Methods*

(1) Continued attendance at radio school.

(2) Government of Vietnam to authorize amateur radio operation and sponsor radio clubs.

a—Police Officers

b—Vietnamese citizens

c—Friendly foreign nationals

(3) Practical instruction during installation of Police Radio systems.

(4) Maintenance instruction on specific equipment.

III—*Amateur Radio Operation*

(1) All persons would be checked for loyalty before licensing.

(2) Persons applying for amateur radio operator privileges may be assumed to have no intent toward improper use. Persons planning clandestine operation of radio station would not be likely to make themselves known by registering with government.

(3) All stations licensed by government may be expected to act as unofficial monitors who will report any clandestine operation they may hear to government. This will be done voluntarily as a step to protect their own privileges which they know are jeopardized by any clandestine operation.

(4) Through government sponsored clubs a large number of persons can be trained to become skilled radio technicians at minimum cost. The privilege and pleasure to be derived from the achievement of obtaining amateur privileges becomes a keen incentive to voluntary participation.

HEARD IN SAIGON, VIET-NAM, MAY 6th to 8th.

21 mc cw: KN1AOK, W1YIS, W4LEV, WØWVZ, VS1GL, VS1GZ, 3W8AA, G3JQX, MP4BBL, KR6QL, KL7FZ, KP4AZ. **21 mc Phone (A3):** W6PJS, W6QUC, W6KTB, W6KUY/MM, G3ABH, VS6CL, VS6CO.

21 mc SSB: DL4RY, F7AN, KH6AR, CN8IZ, VS6BE (Note: Out here we have a jamming station centered on 21455 who blocks everything above 21430. The SSB gang wanting S.E. Asia QSO's should get below 21430 kc.)

14 mc cw: UAØRW, UAØSJ, UAØKFG, UAØKUA, UAØFB, UAØCN, UAØVW, UAØKAA, UAØKDA, UH8KAA, UI8KAA, UJ8AF, UL7KAA, VS1GL, VS1EL, VS1HC, VS1HJ, VS2FF, VU2RT, AP2AD, VQ8AP, ZC4II, KR6RX, KR6CV/KW6, ZC5AL, ZC5RF, KR6QW, KW6AC, UF6AC, G3AAM (1530 Z), 4S7WP, PY1BFR, CX1BO, KV4AA, CO3YP, W3BB, W4CRA, W5BNO.

14 mc AM Phone: VU2ES, HL2AJ, CR9AH, 4S7YL, ET2US, KM6AX, KX6AF, KR6LM, KR6AM, KR6RR, KR6KS, KX6AM, KC6SP, VS1GL, VS2CP, VS2DV, VS6DJ, XE2NF, VS2EK, VE7CB, K6SAI, W6ETJ, ZS6ACU, VS2FI.

14 mc Sideband: KA2NY, KA2YA, KA2MA, KA5MC, KA2FC, KR6MD, KR6QI, KR6AF, KR6USA, KG6NAA, VS6BE, KL7AIZ, ZS5CZ, ZS5QT, K6GMA, W6BMN, W6KNH.

The following frequencies are jammed most of the time by commercials, broadcasting or just plain jamming:
14000-004, 14042-046, 14061-065, 14121-125, 14245-249, 14253, 257, 14257-261, 14271-276, 14297-301 (SSB Stations note!). 21001, 21011, 21031, 21077, 21080, 21184, 21196, 21199, 21207, 21379, 21388, 21390, 21397, 21430-450 (SSB Stations note!).
7 mc is almost completely filled with QRM. Only ham station heard was ZC5RF at 1600 GMT.
P.S. Heard WØNLY QSO VU2BK 1140 GMT May 10th. First WØ and a real hollow 359.

73, Rundy, W3ZA/Saigon

(Ed-Rundy will be in Viet-Nam for two years and will have a KW on CW, AM and CW if permission obtained. Operation is also planned from Cambodia)

Addresses

CN2BQ—P.O.Box 167, Tangier.
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☐ **GETTING STARTED IN AMATEUR RADIO** *by Julius Berens W2PIK*
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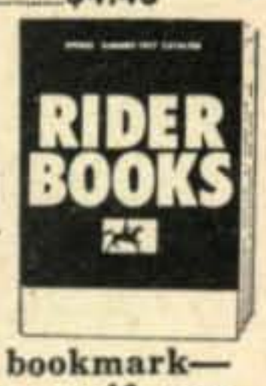

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FQ8AP—(F8SH) Geophysical Center, Ionospheric Section, Box 793, Bangui, Ubangui-Chari, FEA.

HC8GC—Jose Guerrero, San Cristobal, Galapagos Islands. (Ecuador)

HH2OT—Via W4HYW.

HH2Y—Jean, Box 428, Port-au-Prince, Haiti.

HL2AE—Box 162, Kentral, South Korea.

HL2AJ—Radio Club, National University, Seoul, South Korea.

ex-KV4BB, ex-VP2VG March '57—William C. Thomas, C.A.A., Fort Myers, Fla.

M1H—Box 80, San Marino.

MP4BCE—Via W4GNC (He is W4GNC).

OQ5IE—Jane, Box 403, Stanleyville, Belgian Congo.

TI9CR—Jose and Luis, P.O.Box 2412, San Jose, Costa Rica.

VS9AD—R.A.F. Khormaksar, Aden.

VS9AI—Bill, c/o Met. Office, Khormaksar, BFPO 69, Aden.

W3ZA/Saigon—Lyman M. Rundlett, MSUG, Box 34, Navy 150, FPO, San Francisco, Calif.

W4DQA/KS4—902 Plaza Court, Orlando, Fla.

ZS9Q—Via SARL.

4S7RD—Tom Galbraith, SAC, EKALA Transmitters, R.A.F. Negombo, Ceylon.

4X4CJ—Box 3159, Tel-Aviv, Israel.

5A1TB—Lou, Box 372, Tripoli, Libya. (He is W5ARM).

Thanks to the West Gulf Bulletin, W4CEN, W3ZA, W4LHT and K5BGB.

DX'ploits

Chas, W1FH, regains top spot with the addition of VP2VG and ZD4CH with a 275 total . . . Al, W8PQQ, reaches 270 with VP2VG, ZC4CB, CR8AB and VR1B as Dick, KV4AA, adds FW8AA for 269 . . . Gene, W6EBG, goes to 261 with IT1TAI, VP2VG OQØVN and OH1RT/Ø while George, W1GKK, nabbed CR5SP, VP2VG, TI9CR and ZD4BQ for 257 . . . Art, W6SR, added such as UM8KAA, I5RAM, VP5BH, FS7RT and OH1NA/Ø to reach 244 as Pierre, F8BS, hit 241 with IT1AQS and OQØDZ . . . Alfredo, CE3DZ, came up with ZC5AL, OQØCZ, UN1AA, YVØAA, IT1TAI, VK9TW and others for a 241 total while Leo, WØNTA, pushed to 226 with VP5BH, OH2AA/Ø, FG7XC, VK9AJ and FB8ZZ . . . Dan, W6PH, rose to 217 thanks to UO5AA, EA6AF, FB8BD, VP2LU, IT1AGA and ZC5AL as Doug, G3AAE, also made it 217 with 45 addi-

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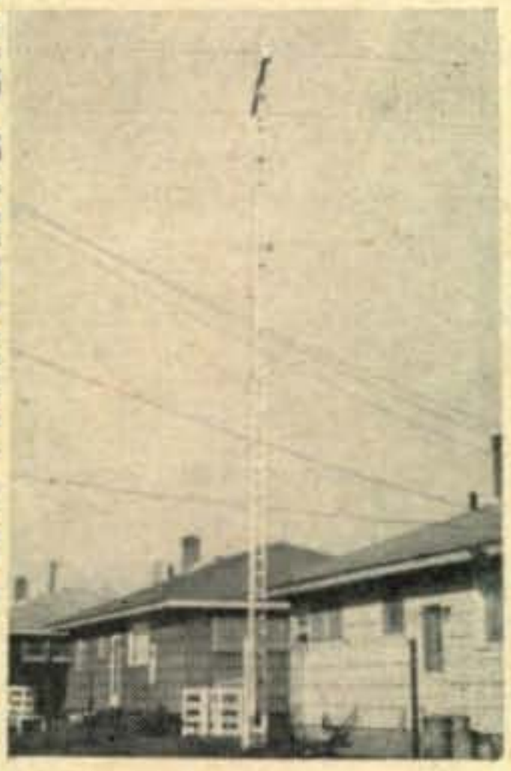


W7YIQ
Russell L. Peck
Walla Walla, Wash.
GPRBS40

W5DA
J. L. Young
Dallas, Texas
GPRBX50

Hams Everywhere Acclaim

E-Z WAY TOWERS

(BUILT ESPECIALLY FOR HAM BEAMS)

- CRANKS UP AND DOWN - TILTS OVER
- 28 DIFFERENT TYPES- 40' TO 60'
- FREE STANDING - NO GUY WIRES - NO CONCRETE
- 80' - 100' - 120' CRANK UP, TILT OVER TOWERS

Ask about the new TPRBZ80-94
for Christmas Trees. — No guys.

SEND TODAY FOR FREE CATALOG

Dept. HQ, E-Z Way Towers
P.O. Box 5491, Tampa, Florida

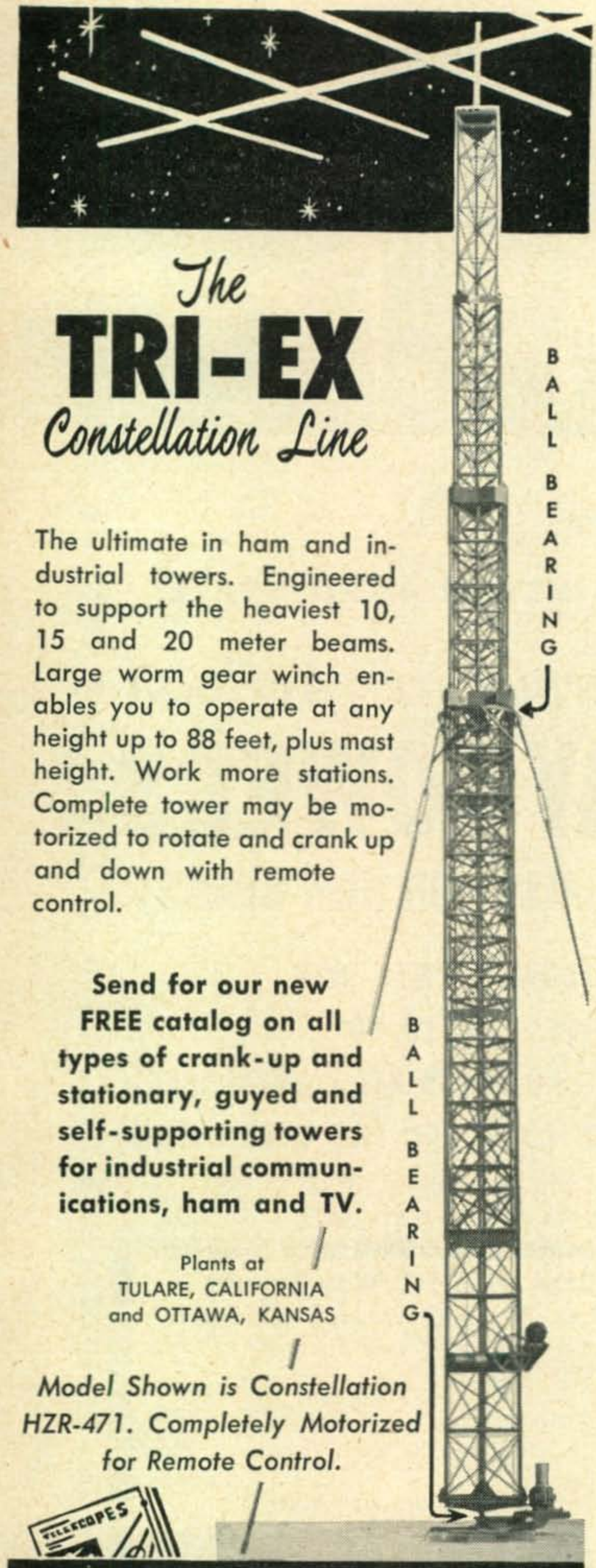
Send me your FREE catalogue on the following towers:

☐ Broadcast ☐ Television
☐ Ham Radio ☐ Two-Way Communication

I am interested in a tower _____ ft. high.
I will use a _____ antenna.
(State type and model)
Type of Rotor _____
Name _____
Address _____
City _____ State _____

E-Z WAY TOWERS, INC.
P. O. Box 5491 - 5901 E. Broadway - Tampa 5, Florida - Phone 4-2171
Cable address: E-Z Way Tower
"TOWERS ARE OUR BUSINESS"

For further information, check number 29 on page 126.



The
TRI-EX
Constellation Line

The ultimate in ham and industrial towers. Engineered to support the heaviest 10, 15 and 20 meter beams. Large worm gear winch enables you to operate at any height up to 88 feet, plus mast height. Work more stations. Complete tower may be motorized to rotate and crank up and down with remote control.

Send for our new FREE catalog on all types of crank-up and stationary, guyed and self-supporting towers for industrial communications, ham and TV.

Plants at
TULARE, CALIFORNIA
and OTTAWA, KANSAS

Model Shown is Constellation HZR-471. Completely Motorized for Remote Control.

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TRI-EX TOWER CORPORATION
127 EAST INYO ST., TULARE, CALIF.

NAME

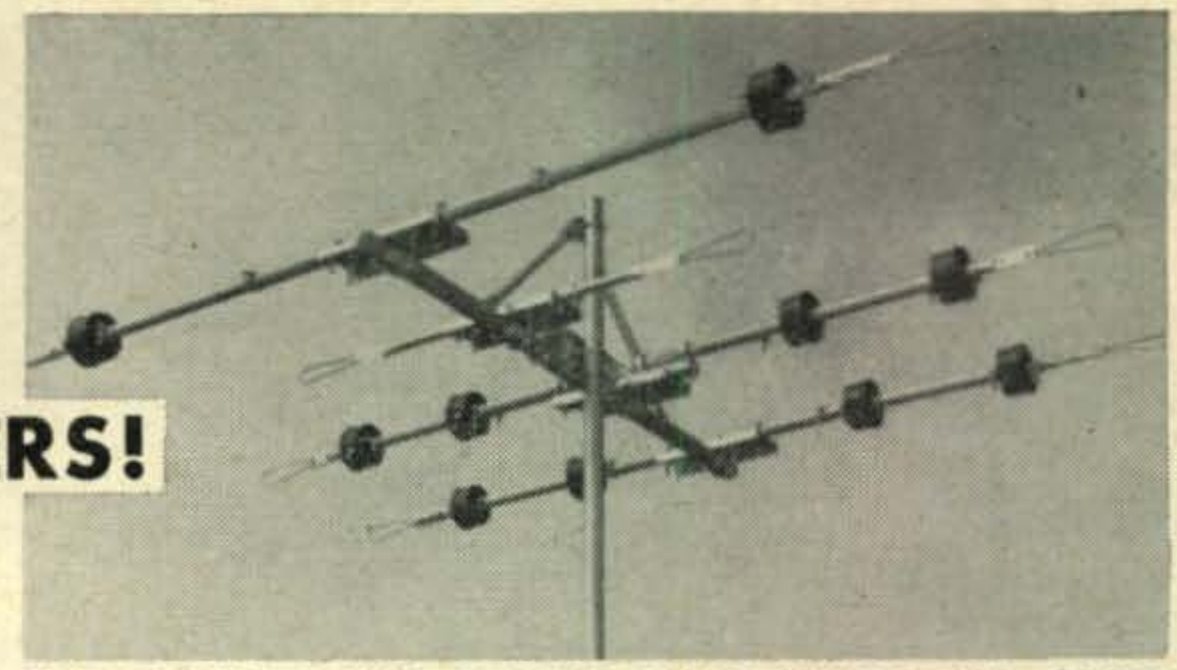
ADDRESS

CITY STATE

For further information, check number 72 on page 126.

tions . . . KC, W6RLN, snagged LZ1WD and PJ2ME for 213 while Hector, LU8EN, rose to 209 with VP5DC, HS1D, VP2LU, FL8AB, VQ6LQ and YK1AC . . . Stan, W1CLX, adds CR8AA, ZD4CB and FW8AA for 263 as Bill, W8KPL, goes to 233 with such as OH1ST/Ø, MP4BBA, KAØIJ, VK9AJ, SVØWD, BV1US, YJ1RF, FL8AB, UM8KAA, UO5KPM and VP2VG . . . Chas, W3DKT, ups to 229 with ZA1AA and UJ8KAC while Larry, W6CAE, submits revised list with 222 total . . . Bob, W6DBP, keyed with HS1WR and VP2VG to reach 217 as Alan, K6EIV, jumps from 36-139 to 39-212 with the better ones being TA1FA, UO5AA, UM8KAA, EA6AF, EAØAC, G3FYR/VS9, FE8AH and FL8AB . . . John, W9WCE, hits 197 with IT1TAI, UL7KAA and UI8KAA while Dom, IT1TAI, sends new list with 191 total . . . Skip, W9YSX, reaches 190 with such as FB8ZZ, SVØWE, VP8AQ, VP5BH, VK9YT, JZØPC, TI9CR, ZD4CB, KC6RK, UJ8AF, VP2VG and YA1AM as Carl, W4NBV, also makes it 190 with ZD6DT and ZD9AC . . . Frank, OE1FF, submits new list with 39-176 tag while Dick, W2PZI, reaches 152 with VS1GX, VK9AJ, OH2AA/Ø, VP2VG, VP2AD, UO5AA, UP2AS HI8BE, UR2AO, VP5BH and VKØAB . . . The addition of VP2VG gave Frank, W8QJR, 219 and 218 on phone as Aleta, K6ENL, moved to 171 with HC8GI, SV1SP, VQ5GC, FE8AH, KG4AI and UL7KBK . . . Dick, W6TKX, reached 154 with PJ2ME, FE8AH, KC6JC, GC2FZC, ZD1FG, ZD9AE and GW5TW while Al, W1JNV, sends revised list with 195 total . . . Norm, DL4RI, adds UF6AB, SVØWD, VQ6LQ, CR7DQ and ZB2A for 142 as Ted, G2HKU, hit 133 with CR6AI . . . Chas, W2AZS, sends new list with 178 while Phil, K4EHA, rose to 130 with such as KC4USB, ZK1BG, HI8BE, VR3B, FK8AL, YS1A, IS1MM, UP2AS, UO5KPM, UJ8KAA, PZ1AI and I1BLF/T . . . VKØAB seeks DXCC from Antarctica and has a 79 total after four months there . . . Jim, CE3ZO (ex-G6ZO), has 165 (101 confirmed) after 10 months in Chile . . . Jon, W8GKB, has 54 after 2 months activity on 21 Mc. A valiant attempt to get Utah on OY7ML's last day of operation was unsuccessful. Utah stations were on hand but just wouldn't filter through . . . Newt, W4LHT, made it an even 100 with HH3DL . . . Fred, W3EOB, side-swipered VU2RM, VP2VG, ZS3Q, FK8AL, VP5BH, UD6DD, FL8AB, UO5AA, VR2DA, VK9XK-AT and FE8AH for 38-156 . . . VP2LU is up to 34 zones and 130 countries after over 5000 contacts from St. Lucia. He lacks Idaho QSL for WAS . . . April activity at W6KG, Lloyd, resulted in morsels such as FF8AJ, KG1AA, YO3ZA, HH2OT, ZA1AA, EA8BF, VQ2IE, FY8YE, UA1KAQ and VS1HJ . . . Pete, W1BPW, nabbed IS1MM, UO5CA, MP4BBA, LX2GH, VP5BH and HI8BE for a 91 total . . . KV4AA with No. 99 for K4DRV (Tom) . . . EA2CA

HARRISON
IS HEADQUARTERS for hy-gain GLOBE SPANNERS!



Now, new improved weatherproofed and tunable "Insu-Traps" make them even better! Pre-tuned by the factory for positive performance, but color code calibrated for ease in peaking from phone to CW, or to any favored part of the bands. Rated at full KW. Perfect match (lower than 1.65 to 1 SWR) to a single 52 ohm co-ax line on all three bands—10, 15, and 20. Ruggedly constructed, for years of dependable performance.

THE TRIPLE BAND BEAMS THAT HAMS ALL OVER THE WORLD HAVE BEEN RAVING ABOUT!

ONE ELEMENT
Single three-band dipole, may be rotated or fixed in favored position. 28 feet long, weighs 10 lbs.
Model 152-T1, $39.95

TWO ELEMENT
A space saver that can give you a healthy 5.8 db gain in signals transmitted and received! Boom only 6 feet long. Has separate 10 meter reflector. Wt. 36 lbs.
Model 152-T2, $69.50

THREE ELEMENT
The favorite! Now with separate 10 meter reflector. Greatest power gain per Dollar, 8 db on all bands! 18 foot boom, 29 foot element. Weighs 58 lbs. **Model 152-T3, $99.75**

(Additional 10 meter director element, for even more boost in power. **Model AD-1, $14.95**)

FIVE ELEMENT
The DeLuxe array that is the ultimate in a three bander! Its 12 db gain is the equivalent of increasing power by 16 times, makes a 200 watter pound thru QRM like a 3 KW rock-crusher. 36 foot boom. Wt. 96 lbs. **Model 152-T5, $395**

COME TO HAM HEADQUARTERS, USA, *AND SEE EVERYTHING!*

Inspect the internal features of the unique Insu-Traps, look over the quality of material and workmanship of these hy-gain antennas, and you'll surely take at least one home with you! (With these new highways it really isn't much of a trip, from even Maine, Ohio, or Virginia!)

"TOPPER" AUTOMATICS

Only 21 feet high, but capacity top-hat and three Insu-traps give automatic selection of 10, 15, 20 and 40 meter bands; optional calibrated base loading coil manually extends coverage to 80 and 160. Low SWR to 52 ohm co-ax cable when radials or ground used. FB for vacation time, or city cliff-dwellers.

Complete with base, all hardware, and complete instructions.

Model 40-AV $27.95

Model 80-AV $29.95
(With loading coil for 80.)

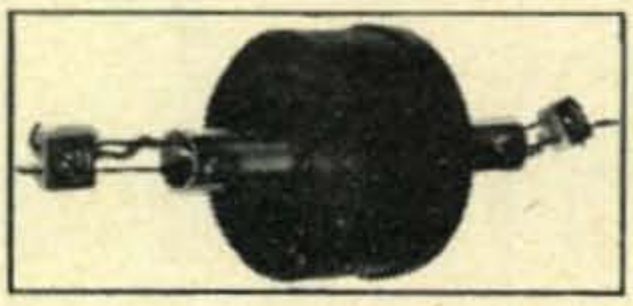
Model 160-AV, $32.95
(With coil for 80/160.)

ECONOMY "TOPPERS"
A 22 foot, 9 inch vertical radiator, with top-hat capacity loading and calibrated base coil for tap selection of any band, 6 thru 40 meters.

Model 40-V $18.95

Model 80-V $19.95
(For 6 thru 80 meters.)

Model 160-V $22.95
(For 6 thru 160 meters.)



hy-gain 5 BAND WONDER DOUBLET COILS

One pair of these new, improved Insu-traps in a 107 foot long wire antenna, fed at the center with a single 75 ohm twin-lead (or 52 or 72 ohm co-ax), and you have a high efficiency radiating system which automatically loads beautifully on 10, 15, 20, 40 and 80, and really puts out! Rated to handle a full KW, guaranteed a full year. Ideal for portable lash-ups.

Pair of Insu-Traps, pre-tuned for top performance (but with internal variable capacitor color code calibrated for peaking from phone to CW, or to any favored part of the bands), complete with no-solder antenna wire clamps and detailed instructions. **Model 58DC, $12.50**

Kit of 150 ft. #14 enameled copperweld wire, special center and 7" end insulators, and 8 Burndy wire clamps. **Cat. HDK, $6.94**

Amphenol 75 ohm heavy duty KW twin-lead. **Per foot, 7c**

hy-gain ECONOMY BEAMS

Well designed and sturdily constructed beams, at money-saving value prices. Pre-tuned for peak performance and perfect impedance match, without any fussing.

Band	Elements	Gain	Model	Price
2	5	10.5 db	25	$ 7.95
2	10	12 db	210	9.95
6	5	10.5 db	65	14.95
10	3	8.5 db	103	19.95
15	3	8.5 db	153	29.95
20	3	8.5 db	203	49.95

roto-brake

The amazingly simple but effective IRON FIST that holds your beam mast from turning in even the highest winds (up to 80 MPH!), protecting the TV type rotator and your beams from damage. Also provides thrust and radial bearing support for heavy beams. Just 2 wires to rotator control box terminals gives it automatic single control of the roto-brake. With brackets for mounting inside 10 to 18 inch dia. towers. **Model RB-1, $74.50**
(Special brackets available for outboard mounting to poles, masts, and smaller towers)
Recommended TV type rotator.
CDR Model AR-22, $31.17

52 OHM CO-AX Fresh, new, genuine (branded) RG-8/U coaxial cable. Cut to order, **per ft., 13c**

A POST CARD TO HARRISON WILL QUICKLY BRING YOU BROCHURES WITH TEN PAGES OF DETAILED SPECIFICATIONS AND ILLUSTRATIONS.
PROMPT SHIPMENT TO ALL PARTS OF THE WORLD, RIGHT FROM THE HARRISON COMPLETE NEW YORK STOCK.

APO? FPO?

Harrison gives special attention to MARS, Welfare Fund, and Military personnel requirements. We've sent beams, receivers, transmitters, etc. to almost every place but a Space Platform!

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Ham Headquarters Since 1925
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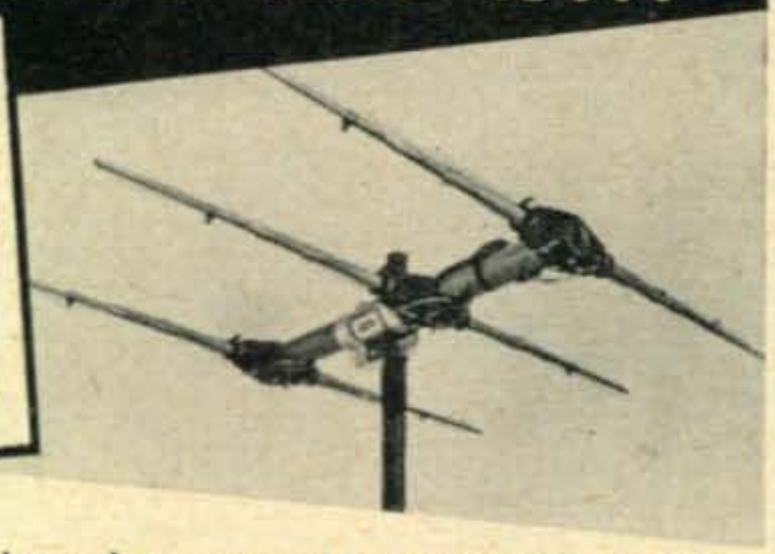
EASIEST TERMS

With a Harrison Charge Account you need pay only one-tenth each month. Send a few references and deposit with your order for quickest service.

For further information, check number 30 on page 126.

HARVEY has it...

TELREX '56 Beam Antennas



Commercial grade arrays at amateur prices; superior in performance, design and construction. Hairpin resonated, precision tuned, matched and calibrated. Provide highest signal-to-noise ratio possible; 75% reduction in precipitation static.

FEATURES

- Extremely rugged elements of advanced sectional design; taper-swaged to reduce useless wind drag and silhouette by 55%.
- Special sturdy molded element support made of Borg-Warner "Cycolac", a very high impact thermoplastic resin; holds, insulates and capacity-couples element to the boom for automatic dissipation of precipitation static.
- Stainless-steel airplane-type clamp, holds element sections firmly in exact position.
- Precisely constructed and the famous Telrex "Balun" help produce outstanding performance per element, clean-cut balanced pattern and minimum TVI.
- Single, heavy-wall aluminum boom is small in size, rugged in strength, and light in weight.

"SERIES 56" SPECIFICATIONS AND PRICES

Telrex No.	Meter Band	Elements No.	Gain db	Shpg. Wt. Lbs.	Amateur Net Each
¾M-15C	¾	15	16.2	13	$ 29.00
1¼M-5C	1¼	5	11.9	3	6.95
1¼M-15C	1¼	15	16.2	16½	31.00
2M-3C	2	3	9.4	2¼	5.95
2M-5C	2	5	10.5	3	7.25
2M-6C	2	6	12.7	4	12.50
2M-8C	2	8	13.5	10	13.75
2M-808†	2	16	10.5	15	33.50
2M-15C	2	15	16.2	28	39.25
6M-3D	6	3	9.4	7	16.25
6M-4C	6	4	9.7	10	19.75
6M-6C	6	6	12.7	20	57.50
6M-56-135§	6	6	12.7	44	149.00
1030-S	10	3	7.0	9	36.50
10M-56-79‡	10	3	8.9	27	96.00
10M-56-120‡	10	4	10.1	33½	144.00
10M-56-185§	10	5	11.2	77	220.00
10M-56-235§	10	6	12.7	93	290.00
15M-56-67‡	15	2	4.8	22	80.00
15M-56-99‡	15	3	8.9	32	117.00
15M-56-118‡	15	4	9.7	37	140.00
15M-56-198§	15	4	11.1	64	235.00
15M-56-245§	15	5	11.9	94	285.00
20M-56-79	20	2	4.8	26	89.00
20M-56-112‡	20	3	8.7	33	130.00
20M-56-149§	20	3	9.0	56	175.00
20M-56-168§	20	3	9.4	63	198.00
20M-56-235§	20	4	10.4	74	275.00
20M-56-265§	20	4	11.2	90	305.00
40M-56-180	40	2	3.4	66	180.00
40M-56-365§	40	3	8.3	130	365.00

†Circular polarized. ‡Deluxe Model. §Super Deluxe Model.

Harvey has in stock the New Tri-Band Antennas for 10-15-20 Meters

MAIL ORDERS SHIPPED SAME DAY AS RECEIVED

Include with payment an allowance for shipping charges. Prices subject to change without notice.

HARVEY Estab. 1927 RADIO CO., INC.

1123 Avenue of the Americas (6th Ave. at 43rd St.) N.Y. 36, N.Y. JU 2-1500

For further information, check number 31 on page 126.

received new KWS-1 and provides a new country for the SSB boys with his terrific signal . . . Lee, W5TP, has had 41 QSO's with ZS5AM and 34 with ZS6IF, on 14 CW, between Sept. and Apr. . . . Dale, K6IUL, studies Spanish in school and is aided by many Latin phone QSO's. Other contacts on 21 phone with new beam were CE3LL, KZ5PE, DL9XR, VP2KD, VS2DQ, EL5A, ZP5CF and OQ5GI for a 42 total . . .DL6ZZ, Gus, completed his 1000th W/K QSO on March 17th. These were made on 14 and 21 CW with 40 watt rig and dipole antenna and covered the period 1951 to 1957. States only total 43 as some are very difficult to work . . . W1BFT has worked 329 prefixes to Apr. 27th with 85 confirmed while Tom, WØIUB, reports 169 to Mar. 30th . . .

Honor Roll Endorsements

(To May 15th, 1957)

W1FH	40-275	W8KPL	39-233	W8QJR	38-219
W8PQQ	40-270	W3DKT	39-229	K6ENL	38-171
KV4AA	40-269	W5ABY	39-228	W6TKX	38-153
W6EBG	40-261	W6CAE	39-222	W1JNV	37-195
W1GKK	40-257	G3FXB	39-222	W8KZT	37-164
W6SR	40-244	W6DBP	39-217	DL4RI	37-142
F8BS	40-241	K6EIV	39-212	G2HKU	36-133
CE3DZ	40-241	G3FKM	39-207	W9VL	36-122
HB9X	40-227	W9WCE	39-197	W2AZS	35-178
WØNTA	40-226	IT1TAI	39-191	W1YNP	35-136
W6PH	40-217	W9YSX	39-190	K4EHA	35-130
G3AAE	40-217	W4NBV	39-190	K6OPI	35-97
W6RLN	40-213	JA1CJ	39-186	PHONE ONLY	
W7RT	40-210	CE1FF	39-176	ZL1HY	40-168
LU8EN	40-209	SM5CCE	39-162	W8QJR	38-218
W1CLX	39-263	W2PZ1	39-152	G3FXB	36-167

Last complete HONOR ROLL appeared in the May issue. Next complete HONOR ROLL will appear in the September issue.

WAZ Top Fifty

W1FH	275	W7VY	264	W1GKK	257
W6AM	274	W3JNN	263	G6ZO	256
W6AOA	270	W6SN	263	W5KUC	256
W6MX	270	W6CUQ	263	W9HUZ	256
ZL2GX	270	W6VE	263	W7AMX	255
W8PQQ	270	PY2CK	262	W7GUV	255
W6ENV	269	W6VFR	261	WØYXO	252
KV4AA	269	W9NDA	261	CE3AG	252
W6SYG	268	W6EBG	261	W8HGW	251
W2AGW	267	W6ADP	260	W8BRA	251
W3KT	267	W8BHW	260	W6NTR	251
W8JIN	267	W6GFE	260	VK2DI	250
W9VND	267	W6MEK	259	GM3DHD	250
W8KIA	266	W3EVW	259	W8NBK	249
W6DZZ	265	W2BXA	258	W6NNV	248
W3GHD	265	W6TS	258	KH6IJ	248
W6SAI	265	W6TI	258		

Other 250-Plus

W5ASG	39-269	W2WZ	39-255	W8UAS	39-251
W1CLX	39-263	W5ADZ	39-254	W2QHH	39-251
W9RBI	39-259	W1BIH	39-254	W8JBI	39-250
W3EPV	39-256	W9LMN	39-252		

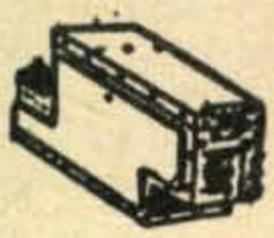
WAZ and 200-Plus Phone

PY2CK	40-244	W8KML	39-220	W3JNN	37-234
VQ4ERR	40-241	XE1AC	39-217	G3DO	37-205
W6AM	40-221	W3LTU	39-206	W3KT	37-203
G8IG	40-199	W9NDA	38-225	W1NWO	36-225
ZL1HY	40-163	W8QJR	38-218	W1MCW	36-223
W6ITH	40-161	CE3AB	38-214	W4HA	36-214
W9RBI	39-240	W2BXA	38-211	W5ASG	36-205
W6DI	39-233	W3GHD	38-209	CO2BL	35-210
CX2CO	39-222	W6KQY	38-207		

Here and There

ex-DL2RO is now back home at G2DC . . . Mario, FY7YE, spends ten days in NYC before trip to Paris at end of July. Phone No. is Audubon 3-4332 . . . G3HSN goes to VK-land

[*Continued on page 108*]



ARC-5/R28 RECEIVER 2-meter Superhet, 100 to 156 Mc in 4 crystal channels. Complete with 10 tubes. **BRAND NEW** **$18.95**
110 V AC power supply kit $9.75
ARC-5/T23 TRANSMITTER companion for above; includes 2-832A and 2-1625 tubes. BRAND NEW, complete with tubes $19.95

ARC-5/T23 TRANSMITTER **$5.95**
Excellent used, less tubes $7.95
BRAND NEW, less tubes $8.95
ARC5 MODULATOR, type MD7 BRAND NEW $8.95

Ham Special! Famous BC-645 Transceiver

BRAND NEW carton, BRAND NEW, complete with 17 tubes, less power supply. **Conversion Instructions included.** Shpg. wt. 25 lbs. **$29.50**

With MANUAL for Easy Conversion to CITIZENS' BAND!

Makes wonderful mobile rig for 420-500 Mc. Easy to convert for phone or CW 2-way communication. This swell rig originally cost over $1000—yours for practically a song! You get it all, in original factory

PE-101C DYNAMOTOR for BC-645, has 12-24V input (easy to convert for 6 V Battery operation only) **$7.95**
UHF ANTENNA ASSEMBLY, for BC-645 ..... $2.45
Complete set of 10 Plugs for BC-645 ..... **$5.50**
CONTROL BOX for above $2.25
SHOCK MOUNT for above 1.25

CONVERSION BOOKLET. Instructions for most useful surplus rigs **$2.50**

SCR-522 FINEST 2-METER RIG!

Terrific buy! VHF Transmitter-Receiver, complete with all components. 100-156 Mc. 4 channels, Xtal-controlled. Amplitude modulated voice. They're going fast! Excellent condition.
SCR-522 Transmitter-Receiver, complete with all 18 tubes. COMBINATION ..... **Special $33.33**

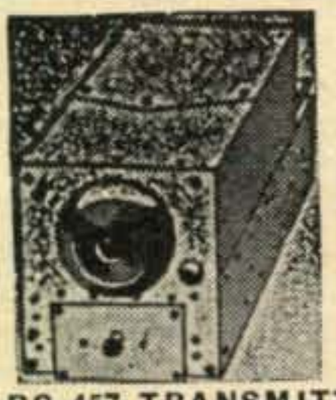
DYNAMOTOR VALUES!

Type	Input	Output	Excellent Used	BRAND NEW
DM-33A	28V 5A 28V 7A	575V .16A 540V .25A	1.95	3.95

DM-32 type Dynamotor, Input 12 V @ 2.4A: output 250V @ .060 A. BRAND NEW **$5.95**

SPECIAL BUY FOR MOBILE HAMS
Brand New DYNAMOTOR, Input: 14 V @ 2.8 A., Output 220 V. @ .080 A. Filter in base. Complete with shock mount and spare brushes **$7.95**

A WORD OF CAUTION to Buyers of Military Surplus Equipment—When comparing prices, check also whether the equipment is USED or NEW—and whether TUBES are included or not.
G & G POLICY IS YOUR PROTECTION: WE CLEARLY STATE WHAT WE SELL!



R24-ARC/5 NAVY TYPE (Similar to BC-946)

BROADCAST RECEIVER

520 to 1500 Kc. 6 tubes: 3—12SK7, 12SR7, 12A6, 12K8. For dynamotor operation. Easily converted to 110 or 32 Volt. 2—IF stages, 3-gang tuning cond. Complete with all tubes, in original **sealed carton.** BRAND NEW **$19.95**

BC-457 TRANSMITTER—4-5.3 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-458 TRANSMITTER—5.3 to 7 Mc, complete with all tubes and crystal. BRAND NEW **$7.88**
BC-459 TRANSMITTER—7-9.1 Mc, complete with all tubes and crystal. BRAND NEW **$11.95**
ARC-5/T-19 TRANSMITTER—3 to 4 Mc. BRAND NEW, complete with all tubes & crystal **$8.88**

SCR-274 COMMAND EQUIPMENT

ALL COMPLETE WITH TUBES

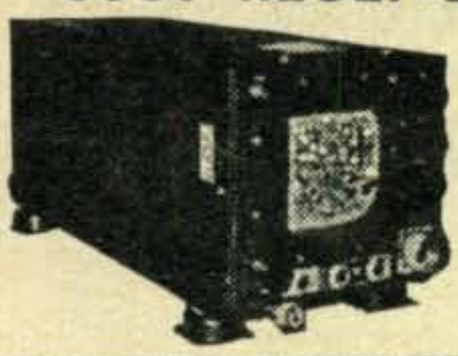
Type	Description	Used	Excellent Used	Brand NEW
BC-453	Receiver 190-550 KC	$10.95	$11.95	$14.95
BC-454	Receiver 3-6 Mc	7.19	8.29	11.95
BC-455	Receiver 6-9 Mc	5.25	7.95	9.95
BC-456	Modulator	2.24	2.75	4.24

110-VOLT AC POWER SUPPLY KIT

FOR ALL 274-N and ARC-5 RECEIVERS

Can be assembled quickly and easily, on pre-drilled chassis. Plugs into the rear of any model 274-N receiver and delivers 24 volts as well as "B" voltage. No wiring charges needed. This is a substantial kit of QUALITY Parts—custom fitted—no cutting or trimming. Don't be fooled by flimsy unsatisfactory imitations! Complete kit of parts with metal case, Instructions **$7.95**
Wired, Tested, Ready to Operate $11.50
SPLINED TUNING KNOB for 274-N RECEIVERS. Fits BC-453 BC-454 and others. Only **49c**

JUST RECEIVED! ASB-5 'SCOPE INDICATOR



BRAND NEW, including all tubes, together with 5BP1 'Scope Tube. Originally used in Navy Aircraft Radar Equipment. Easily converted for AC operation. Value $250.00!

OUR LOW PRICE **$15.95**

ASB-5 RECEIVER for 420 Mc BAND!

As featured in "CQ" for October 1956. Easily converted, makes a marvelous receiver for 420 band, with RF Amplifier! Supplied complete with all tubes, OUR LOW PRICE **$14.95**
Tuning Knob for ASB-5 Receiver $1.29

OPERATING MANUAL for ASB-5 Indicator and Receiver listed above **$1.95**

BRAND NEW SPECIAL PURPOSE TUBES
in Original Individual Packing
JAN CRP-730A MAGNETRON, Raytheon $3.45

6J6W	.45	832A	6.95	3FP7	1.18	6AL5	.44
RK65	7.25	837	1.15	5BP1	2.22	6C4	.33
VR105	.79	1625	.26	5BP4	2.22	6J6	.35
VR150	.79	1626	.16	5CP1	2.45	25L6	.39
2J724B	.35	1629	.27	9LP7	1.88	35W4	.44
807	1.15	8002R	5.95	RECEIVING TUBES		35Z5	.41
811	2.45	NEW CATHODE RAY TUBES				50B5	.44
815	1.99			2X2	.39	50L6	.42
826	.44			6AG5	.35		
829B	7.95	3CP1	1.18				

WESTERN ELECTRIC BREAST MIKE with ON-Off Switch. BRAND NEW **$1.99**

ARC-5 MARINE RECEIVER-TRANSMITTER

Navy Type Comm. Receiver 1.5 to 3 Mc BRAND NEW with 6 tubes **$16.95**
Navy Type Comm. Transmitter 2.1-3 Mc BRAND NEW with 4 tubes and Xtal **$12.45**
DYNAMOTOR for Above $4.95

DETROLA BEACON RCVR BC-1206A

A dandy little receiver for 200 to 400 Kc band. Uses 135 Kc iron core IF's. Complete with six tubes: 6SK7, 6SA7, 6K7, 6SQ7, 2-25L6s. Used **$4.99**

DYNAMIC HANDMIKE with "Press-to-talk" Switch, cord and plug—**BRAND NEW** ..... only **$2.95**

FAMOUS BRAND HI-FI DYNAMIC HEADSET WITH LARGE RUBER EARCUSHIONS
Freq. Range: 40-14,000 CPS. No distortion. **BRAND NEW. Value $45.00** **$7.95**

CD-307A Cords, with PL55 plug and JK26 Jack ..... .99

DYNAMIC HEADPHONES, 600-ohm impedance, with large earphone cushions, cord and phone plug. **BRAND NEW,** special **$3.95**

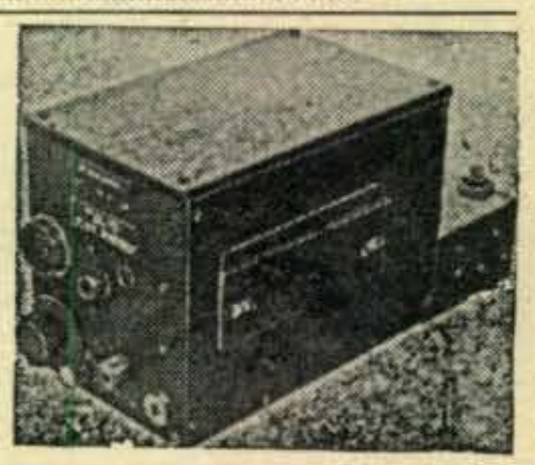
AN/ARR-2 RECEIVER

BRAND NEW — A Terrific Value! Tuning Range 234 to 258 MC. Tubes: 7-9001, 3-6AK5, 1-12A6. Only a few at this low price! **$8.88**

Complete .....

With 28V 1.6A Dynamotor, complete **$12.98**

110 VOLT AC POWER SUPPLY KIT for above **$9.75**



BEAM FILTER (Navy Type) BRAND NEW, complete with 3-ft. cord and PL-55 Plug **$1.88**

FL8-A RADIO FILTER $1.79

2 VOLT BATTERY "PACKAGE"

1—2V. 20 Amp. Hr. Willard Storage Battery $2.75
1—2V. 7 prong Synchronous Plug-in Vibrator 1.49
1—Quart Bottle Electrolyte (for 2 cells) 1.45
ALL BRAND NEW! Combination Price **$4.99**

Please include 25% Deposit with order — Balance C.O.D. 50¢ HANDLING CHARGE on Orders under $3.00 MINIMUM. All Shipments F.O.B. Our Warehouse N.Y.C.

G & G Radio Supply Co.
Telephone: CO 7-4605
53 Vesey St., New York 7, N. Y.

For further information, check number 32 on page 126.

Now In Stock In

"THE WORLD'S MOST PERSONALIZED RADIO SUPPLY HOUSE!"

The Hy-Gain Roto Brake!

Only $74.50

Prevents Damage to Beam!

Provides Radial and Thrust Bearing!

Prevents Coasting and Shifting!

Kits available for adapting to most any type Pole & Tower Mounting.

Converts any TV or other type rotator into the finest Ham Antenna Rotating Assembly.

and the complete line of Hy-Gain ANTENNA PRODUCTS!

PAY JUST 10% DOWN • EASY TERMS!

"World's Largest Distributor of Amateur Radio Equipt."

WORLD RADIO LABORATORIES

3415 W. BROADWAY • COUNCIL BLUFFS, IOWA

PHONE 2-0277

For further information, check number 50 on page 126.

MORE SIGNALS PER DOLLAR From Money Invested in an Antenna

Self Supporting

STEEL TOWERS

For Rotary Beams, FM, TV

Width of Base Equal to 1/5 Height

You can erect this tower yourself. Just dig four holes, set anchor posts in place, bolt the pieces together. 5½ ft. ladder sections make it easy to work higher as tower goes up. It's a lot of fun to build your own tower — and saves you money, too!

ATTRACTIVE — *NO GUY WIRES!*

- 4-Post Construction for Greater Strength!
- Galvanized Steel — Will Last a Lifetime
- SAFE — Ladder to Top Platform
- COMPLETE — Ready to Assemble
- Withstands Heaviest Winds

SMALL DOWN PMT.—EASY TERMS

Vesto Towers are available in a wide range of sizes to meet requirements of amateurs and commercial users alike. Note the low prices for these quality lifetime towers: 22'-$104, 28'-$127, 33'-$149, 39'-$182, 44'-$208, 50'-$259, 61'-$339, 77'-$595, 100'-$895, 55'-$315.

Towers are shipped to your home knocked down, FOB Kansas City, Mo. 4th class freight. Prices subject to change . . . so order now! Send check or money order . . . or write for free information.

Cable address: "VESTO"

WRITE TODAY FOR COMPLETE FREE INFORMATION AND PHOTOGRAPHS

VESTO CO., Inc.

20th and Clay

North Kansas City, Mo.

For further information, check number 51 on page 126.

Letters [*from page 14*]

the experimentation going on, but rather scoffed at the idea of the little bottle ever replacing a good chunk of galena. How wrong can anyone be? I refuse to sit out on a limb again, even though the AM boys still insist that the SSB gang could get the same net results more cheaply by buying a nickel's worth of alum and putting it in the mouth when speaking over the mike.

My pipe has gone out; so it's time to ring down the curtain on old memories that fade so quickly. Radio has been and still is the finest hobby one can have. I am thankful for W8FQD's prodding away at me until I got back in the game two years ago. And—believe it or not, boys and girls—I perspired more when I went up for my ticket than I did in getting my M.A. degree from the University of Chicago back in 1935.

E. H. Bremer, W8DJ
Douglas, Michigan

Tornado-Dallas

Dear OM:

Dramatic staging at its very best could not surpass the drama that unfolded on 3995 kc, April 2 at 4:30 p.m. From Grand Prairie could be heard Joe W5FBL, saying, "You've never seen anything like it" . . . from A. Harris Shopping Center, Steve W5SBF, "Everything is flying through the air" . . . These and many more statements of like nature were being made by mobiles from Oak Cliff into West Dallas, and across town to Love Field where the tornado lifted once again into the sky.

Within a matter of minutes 21 mobiles had checked into service. Within the hour amateurs from all parts of the city had reported to Red Cross Headquarters and were being assigned with disaster workers and equipment in the hardest struck areas of the city . . . in many instances the amateurs had taken only a glance to see that damage to their own homes was small . . . others only checking to see that loved ones were safe before they were ready to participate in giving a life line of communications between the savagely attacked areas of the tornado and Red Cross Headquarters.

Operating from Fair Park, was W5BOH with Norm Willis W5CC and Haskell Bevers W5AVG, directing the Ten Meter Net activities. Buck Talley W5TJE, operated from Red Cross Headquarters and directed traffic on 3995 kc. Not forgetting the drama of death a few years past, Guy Lewis K5DCA, of Waco, had set up equipment of his own, and was operating on Ten Meters by 9 p.m. . . . From Fort Worth, Arlington, Garland, Grand Prairie and other surrounding towns came help on 6, 10 and 75 meters . . . in all, over 100 mobiles were available by 9:30 p.m. . . . 2 meters was added to clean-up operations Wednesday morning.

The velocity and destruction of the tornado was exemplified by the Singleton area (one of the major destruction areas) where Bill Weston W5JOI and Joe E. Stevens W5SBF, operated during the early stages of the clean-up campaign. In this area 93 homes, 7 apartment houses, and two factories were completely destroyed . . . forty-five homes partly destroyed. The toll for the city was high; 10 dead and over 150 injured, with many injured refusing to leave their torn homes to receive medical attention.

Not only does the story of the radio amateur unfold from the scene of the path of the tornado alone, for hundreds of amateurs occupied 75, 40, 20, 10, 6 and 2 meters to pass thousands of pieces of traffic to and from Dallas. Operating on 40 meters well into the early hours of the morning and in some cases over 24 hours of continuous duty could be heard such familiar voices as Iva W5SYL, and her OM, George W5MTQ, Pat W5SPV, and SMU's Radio Club Station W5YF . . . by the hundreds, too many to ever mention, the amateurs worked to tell friends and relatives that loved ones were safe . . . and in a few cases, that they were among the many casualties.

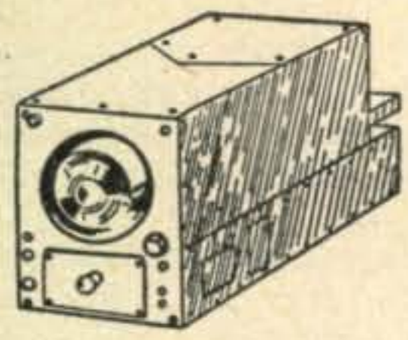
A complete story could never be told of the activities of the Radio Amateurs during this dance of death that fell on Dallas, but one story is very definite and well concluded . . . The RADIO AMATEUR is available for service in any emergency.

Walt Jackson, W5ZYA
Grand Prairie, Texas

SAVE!...BARGAINS GALORE!...SAVE!

NEW LOW PRICES! — EFFECTIVE JULY 1st

COMMAND TRANSMITTERS & RECEIVERS



ARC-5 and SCR274 as available

BC 455

XLNT... $5.95

Depot Repacks... $7.95

Receivers, w/o dynamotors

R-25 Marine, 1.5-3 MC, new $10.95
R-26 or BC-454, 3-6 MC, used $6.95. New 7.95
R-27 or BC-455, 6-9.1 Mc, used $5.95. Depot Repacks 7.95
R-28, 100-156 MC, Exlt 13.95
R-4/ARR-2, 234-258 MC, as is w/o tubes, $2.95, w/tubes, used 4.95

Transmitters, w/o modulator or dynamotor

T-18 Marine, 2.1-3 Mc, as is, w/tubes, 3.95, used 4.95, boxed 7.95
T-19, 3-4 Mc, as is w/tubes, 6.95, used 7.95, new 8.95
T-20 or BC-457, 4-5.3 Mc, as is w/tubes, 2.95, used 3.95 boxed 5.95
T-21 or BC458, 5.3-7 Mc, as is, w/tubes, 2.95, used 3.95, boxed by depot 4.95
T-22 or BC-459, 7-9.1 Mc, as is, w/tubes 3.95, used 5.95, boxed 8.95
T-23, 100-156 Mc, xmitter used, 13.95, xlnt 14.95
Special—1 R-28 Rec. & 1 T-23 xmitter both 25.95

Misc. Command Equipment as available

Receiver dynamotors 28V, used ..... $ 1.00
BC-456 SC Mod. w/tubes, new 4.95, used 3.95
MD-7 ARC-5 Pl Mod w/tubes less dyn. Xlnt 8.95
28 v dynamotors for above unit 3.00
3-Rec. Rack, used 1.49, new 2.49
New 2-Trans. Rack 2.95
New 24V Trans, 1A 3.50
Plugs for rear of receiver 1.00

110 VAC power supply for ARC-5 & 274N Recvrs kit 8.95, Wired & tested 12.85

Receiver Conversion kit: cont. schematic, BFO Sw, 25 K Pot. phone jack and knob, with instructions 1.95

1625 Tubes, for trans # mod, 50¢ 3/1.00

Popular Dynamotor Specials

DM-34 Recvr. Dyna, 12 V in 220 @ 80 ma Out, new 4.95
DM 36 Same as above, 28 V. new 4.95
either of above, used 3.95

PE-101C Dynamotor, 12 or 24 v input, 500 v at 200 Ma out, (300 v 6v in) new 10.95
DM-42, 12 V in. out 1000 and 500, ea at 215 Ma. used 12.95
DM-35, 12V in. 600 at 200 Ma out. Like New 12.95

Wincharger Dyna. 12 v in 440 @ 220 MA Out, new 12.95
BD-69 Rec. Dyna. 14 v in, 220 at 80 MA out, new 9.95
PE-73, 24 v in 1000 at 350 Ma. out. New 8.95, used 6.95
PE-94, 28 v in for 522, 300 at 250 Ma, 150 bias, and 12 V 10 A, new 4.95

"CITIZEN'S BAND!"

420-465 MC. TRANSCEIVER. This is the famous APN-1. In excellent condition, complete but less tubes. Just remove the wobulator (which alone is worth $2.50!) and add a sweep generator. Special!
This month only **$2.95**

12 V Heavy Duty Solenoid. New ..... $ 1.49
5763 Tube. New ..... $1.25 ea. 3 for $3.50
815 Tubes. New ..... $1.49 ea. 2 for $2.75
826 Tubes. New ..... 89¢ ea. 3 for $2.00
BC-654 Transceiver: 3800 to 5800 KC ..... Used: 34.95

Cathode Ray Tubes

5HP4 or 5CP1 ..... New 1.98
7BP7 ..... New 2.98

WESTON—SANGAMO—YOUR CHOICE

METERS.		ALL NEW	
0-2	Ma	0-300	Ma
0-5	Ma	0-500	Ma
0-15	Ma	0-20	VDC
0-50	Ma	0-40	VDC
0-100	Ma	0-300	VDC
0-200	Ma		

2" SQUARE

$3.29 ea.

SPECIAL

3 for $9.00

Heavy Duty Collins choke 4 Hy-300 Ma can take 500 Ma peaks, new 3.95
Bantam 1-watter, BC-746 plug-in transmitter tuning unit from WALKIE TALKIE. 140 mmfd APC type variable cond. plus assorted parts including chassis. Builds into low power transmitter (See CQ March '54) ..... New, $1.29

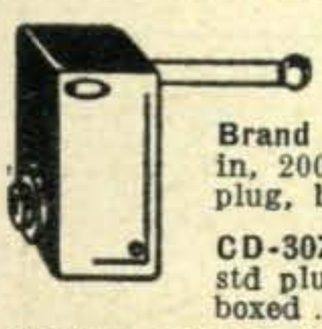
COIL CONDENSERS

2 mfd 5000 vdc new $5.95
2 mfd 1000 vdc new 1.95
10 mfd 600 vdc new 1.49
8 mfd 600 vdc new 1.49
4 mfd 600 vdc new 3 for 1.00
2 mfd 600 vdc new 3 for 59¢

Mobile Microphones, newly assembled, W.E. D173015 similar to the TC-128, push-to-talk switch, 3 cond. 5' curl. cord, new **$3.95**

Chest Mike T-26 w/F1 Button. New $1.49
F-1 Carbon Mike Element ..... 59¢
RT-48A/TPX-4 IFF Trans-receiver 157-167MC. Complete with Tubes, used, xlnt. Makes nice 2 Meter Rig $12.95
BC 655 Signal Generator Range 17.5 to 160 Mc. good for T.V. set alignment, use as transmitter fre. checker, built in 0-200 Ua. Triplett 2" round Meter. New $19.95
Brand New Headphones, HS-23, 2000 ohms, $3.95. HS-33, 600 ohms, complete with brand new rubber cushions **$4.95**

New small cushions, pr. ..... .49
Used chamois cushions, pr. ..... .49
New lg rubber cushions, pr. ..... .29

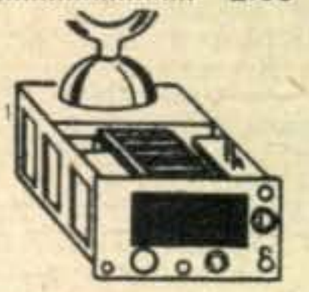


Brand new Impedance matching transformer, plug in, 2000 ohms to 600 ohms, takes std plug, boxed 69¢ each, 3 for **$1.95**

CD-307A cords, has JK-26 on one end for phones, std plug other end brand new, boxed ..... **$ .97**

Stewart Warner Ammeter, 60-0-60 Amps, brand new, 95¢, 6 for 5.00
Phone-CW Filters, 1020 cycles, new, FL-5, 69¢ FL-8 with switch 1.89
GP-7 transmitter with all tubes less 803 tube and 80 meter coil unit only 13.95
less tubes and coil unit 7.95
TU-7, 4.5-6.2 MC; TU-8, 6.2-7.7 Mc; TU-9, 7.7-10 MC; TU-10, 10-12.5 MC; TU-26, 200-500 Kc, choice, used, for BC-375 transmitter, each 2.29
T-30 Throat Mikes, used, 5 for 1.00
3' Mast Sections, MS-49 thru 52, 50¢ each. 53 and above, 75¢ each. Special 1 each MS-49 thru 54, makes 18' vertical 2.95

MN-26C direction finding Equipment
MN-26C Receiver w. dyna 10.95
MN-20E Loop 4.95
MN-52H Az Cont Box 2.95
All above new, special, 1 each for 17.95



Antenna Insulators, Bendix MT-48C, plated end caps, new 15¢ ea., 10 for 1.25
Control Box w/5 Ma S meter, special 1.98
SCR-522, exc. condition. Contains Receiver, Transmitter, Modulator, tubes, tunes 100-156 MC, covers 2 m w/o modification 29.50
New transmitters, GF-11 for 12 volts, or GF 12 for 24 volts, with tubes and built in modulator—less tuning unit, GF-11 $8.95 ..... GF-12 8.85
BC-223 Xmitter New With all Tuning Units 29.50
Used W/One Tuning Unit 18.95
BC-434 Control Box W/5 Ma "S" Meter Used 1.95
T S-24/ARR-2—Calibration Test Set for R-3/ARR-2 Receiver New 8.95

TG34 or TG10, 1 Hour Code Tapes

No. 10, No. 13 ..... New, ea. 1.25

2.00 Minimum Order. All prices Subject to Change without Notice. Canada & Mexico minimum 10.00. Cash with Order. Sorry, no COD. California Orders Include 4% tax. Prices FOB Los Angeles.

SAM'S SURPLUS, 1306 Bond St., Los Angeles 15, California

For further information, check number 34 on page 126.

TUBES

"TAB" TESTED **Guaranteed**
OUR 12th YEAR IN BUSINESS

0A2	.80	5R4	1.00	6Y6	.89	810	10.00
0A3	.90	5U4	.59	6X4	3/$1	811	3.00
0B2	.72	5V4	.89	7C4	.69	812	3.00
0C3	.84	5Y3	.59	10Y	1.00	813	8.00
0D3	.80	6A7	1.00	12A6	.59	814	3.00
0Z4	.50	6A8	1.00	12AT7	.89	815	2.00
1B3	.78	6AB4	.59	12AU7	.69	826	2/$1
1L4	.82	6AC7	.79	12AX7	.79	828	8.00
1R4	.68	6AG5	.69	12SK7	75	829B	8.00
1R5	.78	6AG7	.89	12SL7	.79	832A	6.00
1S4	.78	6AU6	.59	12SN7	.69	837	1.35
1S5	.68	6AJ5	1.00	12SQ7	.69	866A	1.20
2C22	20/1.	6AK5	.69	24G	2.00	954	10/$1
2C39A	11.00	6AK6	.69	25L6	.72	955	3/$1
2C40	7.00	6AL5	.59	25T	4.00	956	3/$1
2C43	8.00	6AQ5	.66	25Z5	.72	957	4/$1
2C46	5.00	6AS7	3.00	28D7	.80	958A	2/$1
2C51	3.00	6AT6	2/$1	35T	4.00	959	1.00
2D21	.68	6BA6	.59	50L6	.69	991	5/$1
2E22	2.00	6BA7	1.00	HK54	4.00	1619	4/$1
2E24	3.00	6BE6	.59	T55	9.00	1625	.35
2E25	7.00	6BG6	1.50	RK20	5.00	1626	5/$1
2E26	3.00	6BK7	1.00	RK38	4.00	1629	7/$1
2E30	2.00	6BQ7	1.00	RK47	3.00	1851	2.00
2V3	2/$1	6BZ7	1.25	H69	4.00	5654	1.00
2X2	2/$1	6C4	2/$1	75TL	15.00	5670	1.00
3A5	.68	6C5	.69	100T	6.00	6146	4.00
3C24	2.00	6CB6	.80	203A	2.00	6550	4.00
3E29	9.00	6CL6	1.10	211	.49	7193	20/$1
3Q4	.68	6H6	.59	233A	1.00	3APIA	6.50
3Q5	.86	6J4	1.72	250T	20.00	3BPI	1.90
3D23	5.00	6J5	.59	254	10.00	3DPIA	6.80
4-65A	15.00	6J6	.59	388A	1.00	3EPI	1.00
4-125	32.00	6K8	1.00	434A	2.00	3KPI	7.00
4-250	35.00	6L6	1.00	450T	43.00	5API	2.95
4E27	7.00	6SA7	.69	717A	4/$1	5BP7A	25.00
4PR60	35.00	6SJ7	.69	801	4/$1	5CPIA	6.50
4X150	19.00	6SK7	.72	802	2.00	5FP4A	3.00
4X250	35.00	6SL7	.89	805	6.00	5JPIA	14.95
4X500	43.00	6SN7	.72	807	1.19	5JPI	8.95
5BPI	1.00	6U8	1.00	808	1.00	5JP7A	18.00
5BP4	1.00	6V6T	1.00	809	3.00	5LP7A	23.00

ARC/5 274N EQUIPMENT SPECIALS!

BC457 As Is $1.39 — BC457/4 to 5.3 Tested $3.95
BC458 As Is $1.98 — BC458/5.3 to 7 Tested $4.95
AN-ARR2/RCVR As Is $1.89 — ARC5/T19/3 to 4 Tested $6.89

We Buy! Sell & Swap As Well!!!
Tubes! Tubes Wanted Top $$$ Paid!

SPECIAL CHOKE CH1001 desgnd W.E. 4 Ey @ 450 ma @ 27 ohms H'Sealed K.V. Insul. Size: 4-9/32x3-7/16x4-13/16 10 lbs. SPECIAL $4 each, 3 for $10, 9 for $27

TRANSFORMERS: *PRIMARIES 115V, 60 cycles, 1Ø.*

TYPE TPF51 RCA H'Sealed Pwr&Fil Transf 1200VCT @ 200 ma, 6.4V@8A,5V@3A & 125V@200ma, 5H7L6"W **SPECIAL!!! $7.95 ea., 2 for $12**
TP501 Pwr 24V @ 8A Tap @ 6.3V wgt 5 lbs. $5, 2 for $9
TPF52 Pwr & Fil 778VCT @ 200 ma. 5V @ 3A, 6.3 VCT @ 5A Uprt dbl shell 4½x3¾x4½ H **$4, 3/$11**
TPF53 Pwr & Fil. 270VCT @ 50 ma, 6.3V @ 2A ea **$2, 4/$7**
TPF54 P & F 150V @ 30 ma, 6.3V @ 1A,, $1.49, 3/$4
Cool that Tube or Equipment MIN-FAN AC input 6 & 12VAC operation. BARCOL mfgr. **$1.49 ea, 4 for $5**
ADVANCE RELAY 12VDC/4PDT **$1 ea, 6 for $5**
OIL 4mfd/600WDDC TLA type upright Tubular **4 for $2**
MICA CONDSR XMTTNG .006@2500WVDC/5KV Test 7for$1
FILAMENT TRANSFORMER 866A/2.5VCT/10A/7.5KV $2.98
866A Combination 2/tubes 2/ceramic sockets & filament transformer 2.5V/10A/7.5KV **SPECIAL! $5.89**

CHOKE W. E. 8Hy @ 400ma, **$5 ea., 2 for $9**
CHOKE RCA 10Hy/150ma/H'sld, **$2 ea., 3/$5**
MILLER 2.5 mh/2.5 & 5mtr CHOKES **12 for $1**
LINE FILTERS 10A/130VAC DC/.1 to 1 Kmc's **$1 ea.**
NATIONAL R300/1mh/300ma RF CHOKE **4 for $1**
WESTON RFmtr/3½"/120ma/3½", **$14 ea., 2 for $24**
RF METER 475ma & 5Amps/3½"/GE **$4 ea, 2 for $7**
METER 800ma/3½"/2% Accy/B'KLT CSD **$3 ea., 2/$5**
Sq/Rd one Ma/2%Acy 1½" PRECISION MTR **$4 ea., 2/$7,**

60mcs/85DB Gain IF STRIP W.E. Dsgn mfrd by MOTOROLA contains 8/6AK5 & 1/6AL5 Tubes. Compact 2" W 11 L 2⅜" HGT. output JACK & COAXIAL INPT Plug Complete **$14 ea., 2 for $25.**

Each "TAB" Kit Contains The Finest Selection

Kit 25 Precision Resistors	Kit 40 Ceramic Insulators
Kit 10 Switches	Kit 25 Power Resistors
Kit 25 Knobs	Kit 65 Mica Condensers
Kit 75 Carbon Resistors*	Kit 5 Crystal Diodes
Kit 36 Panel Lamps	Kit 250 Ft. Hook Up Wire, Ass'td
Kit 10 Electrolytic Cond's	Kit 100 Fuses Assorted
Kit 15 Volume Controls	Kit 35 Ceramic Condensers
Kit 25 Tube Sockets	Kit 10 Rotary Switches
Kit 50 Tubular Condensers	Kit 6 Piezo Xtals & Holders
Kit 500 Lugs & Eyelets*	Kit 60 Inductors & Coils
Kit 10 Bathtub Oil Cond's	Kit 5 Microswitches
Kit 5 lbs. Surprise Package	Kit 10 Wheat Lamps
Kit 10 Transmit Mica Cond's	*In Plastic Box

Order Ten Kits
We Ship Eleven!!!
EACH KIT ONLY . . . **99c**

Every Kit Sold On "TAB" Money Back Guarantee!

"TAB" TERMS: Money Back Gtd. (cost of Mdse. only), $2 min. order F.O.B. N.Y.C. Add Shpg. charges or for C.O.D. 25% Dep. Tubes Gtd. via R-Exp. only. Prices shown are subject to change.

111CK Liberty St., N.Y. 6, N.Y., Rector 2-6245

For further information, check number 35 on page 126.

Halo

Dear Wayne:

Dr. Bob Mellen, W1IJD and I have been working on mobile 2 meter halo antennas recently and were somewhat chagrined to see W1EYM's lead article in the April issue of CQ. Scooped again!

The results we have had so far have been far beyond our fondest expectations. Our approach is very much the same as Bishop's. I punched a hole thru' the top of my '52 Chevy coupe and "Doc" mounted his on a bracket fastened to the hinge bolts on '57 Ford station wagon.

Doc's shack is about 15 or 16 miles from mine and the halos provide excellent mobile coverage on our way to work in New London, though the terrain is very hilly between us. A "J" antenna has been used under similar conditions with very much inferior results. The annoying rapid "mobile" flutter has been reduced to negligible proportions. The use of a nylon bolt spacer across the gap in halo helps this by preventing antenna movement which previous halos permitted. While my Chevy has never been "suppressed," there is no interference at all where I had previously given up mobile work when using a ¼ wave whip due to the terrific spark plug hash.

Bob had a most amusing anecdote to relate about what happened to him as he drove home from New York last Sunday along the Merritt Parkway. Bob was in QSO with a station across the sound on Long Island and in the interests of safety, was easing along at about 50 mph. Many cars were passing him. In one car there were several black-robed sisters who were seen to burst into highly amused laughter as they passed. Bob was somewhat non-plussed and remarked to his XYL about, "What in the world could be so amusing to the nuns?" Said XYL then pointed out that the location of the "halo" on the left rear of the car appeared to the overtaking car to be directly over his head!

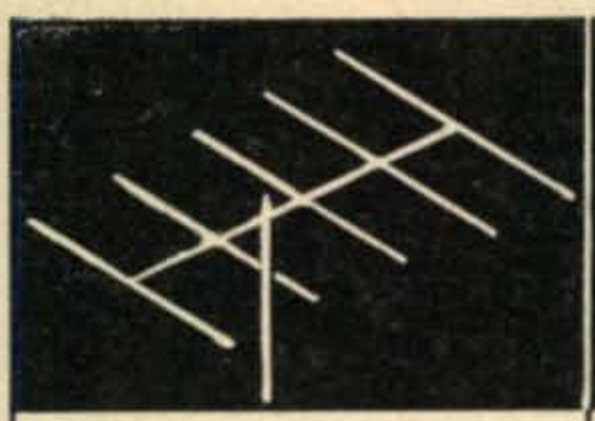
I am enclosing a cartoon which may serve to illustrate the general effect the halo has on the public.

Carl Milner, W1FVY
Groton, Conn.

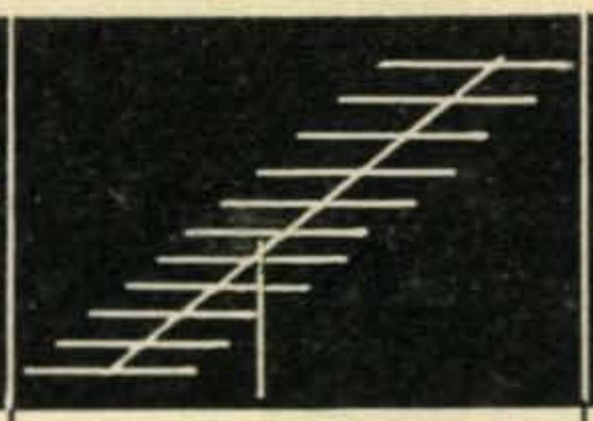
Tuning By S-Meter

Dear Editor:

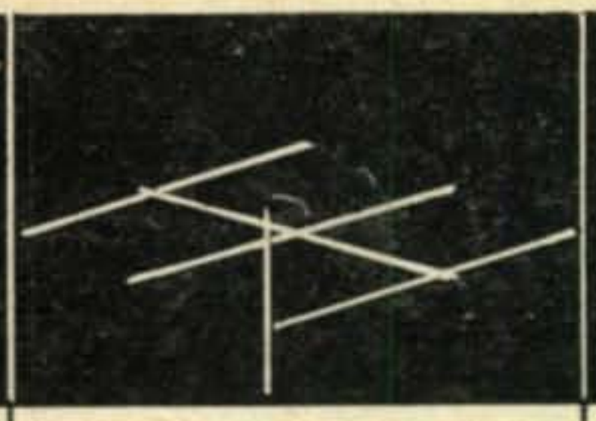
I've found a new use (at least to me) for the S-Meter on my receiver. It makes a mighty handy—and accurate—indicator for tuning up the old rig! Ground the an-



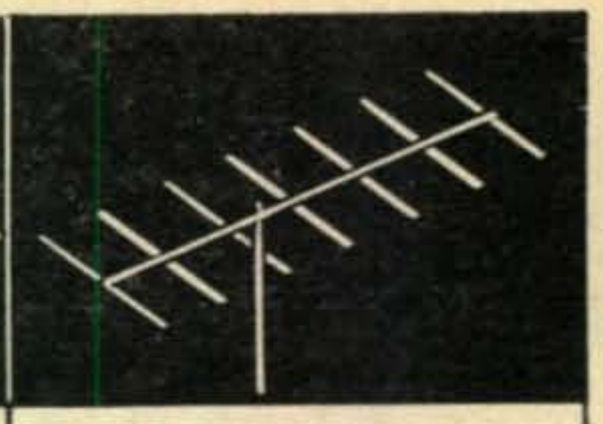
MODEL No. A50-5
6 meter 5 Element Beam
Price $19.50



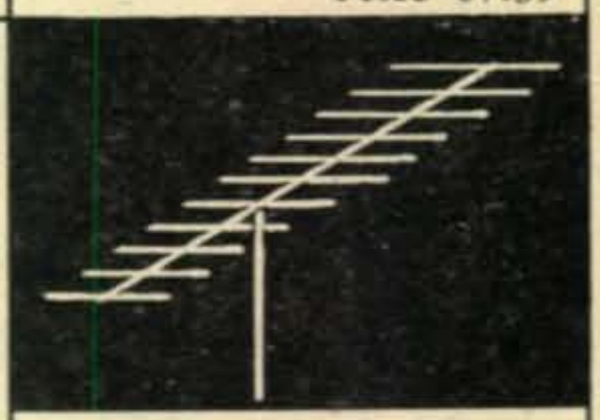
MODEL No. A144-11
2 meter 11 Element Beam
Price $11.50



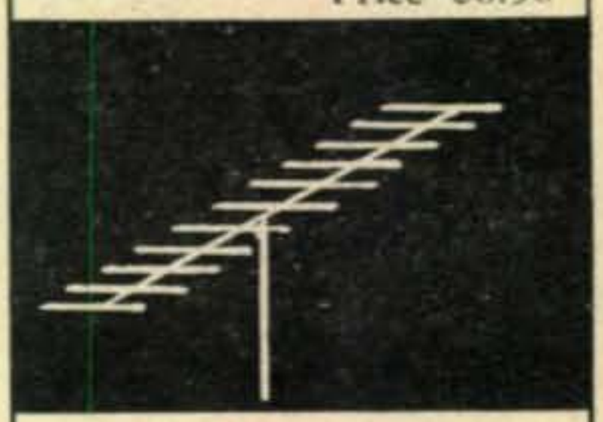
MODEL No. A28-3
10 meter 3 Element Beam
Price $24.50



MODEL No. A144-7
2 meter 7 Element Beam
Price $7.35



MODEL No. A220-11
1¼ meter 11 Element Beam
Price $8.50



MODEL No. A430-11
¾ meter 11 Element Beam
Price $6.50

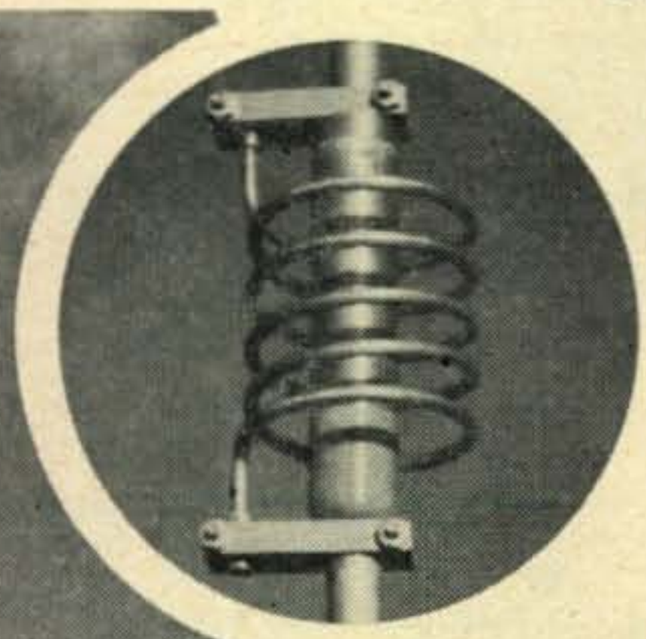
There's a . . .

Cush Craft **ANTENNA**

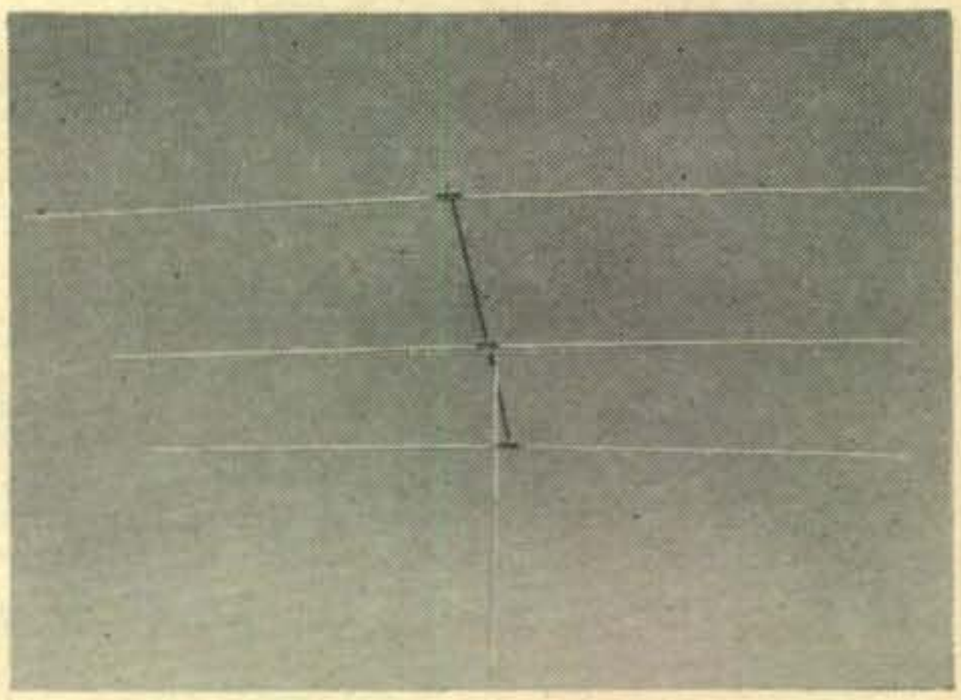
. . . for Every Ham Use

CUSH CRAFT GROUND PLANE ANTENNA

is ideal for big-city dwellers or small lot owners. Model No. AGTP-3 Tri-Band Trapped Vertical Ground Plane Antenna for 10, 15 and 20 Meter Bands ELIMINATES SWITCHING AND TUNING —the "Traps" do the switching and tuning for you! This model is pretuned but can be adjusted.



MODEL No. A21-3 15 METER BEAM $29.50



SPECIFICATIONS

FEED LINE one 52 ohm cable
VERTICAL ELEMENT telescoping 61ST6 .058 wall aluminum tubing
TRAPS rigid air wound self supporting coils of 3/16" aluminum rod.
CONDENSER aluminum tubing insulated with phenolite.
SUPPORT heavy wall pipe with set screw to lock mast, which may be any pipe or pole up to 1⅜" diameter
4 RADIALS of heavy stranded aluminum wire with strain insulator at the end of each radial, radials act as guy wires for the antenna
COMPLETE ASSEMBLY ready to install (less feed line) with radials and insulators attached

Ask for CUSHCRAFT At Your Favorite Distributor

Cush Craft

621 HAYWARD STREET MANCHESTER, N. H.

For further information, check number 36 on page 126.

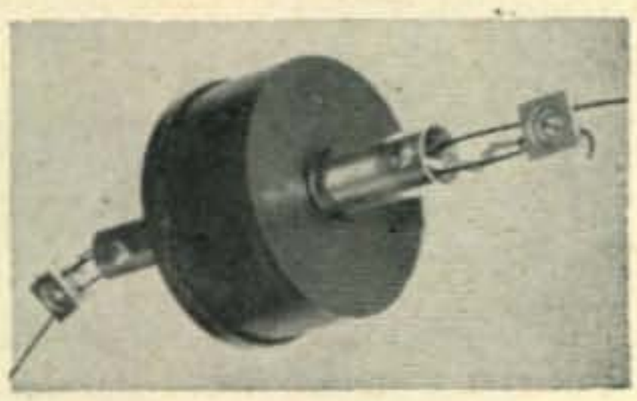
Now In Stock In

"THE WORLD'S MOST PERSONALIZED RADIO SUPPLY HOUSE!"

THE HY-GAIN "Wonder Doublet"

The only tunable, weatherproof trap circuit in existance!

$12.50 per pair



Complete doublet, with instructions: $24.50

Tunable, 10-80M. Resonant on the five most popular bands, complete with 88 ft. of KW amphenol Twin-Lead. Capacity can be varied for resonating trap circuit on any fone or CW frequency. Constructed of No. 14 copper clad steel antenna wire. End insulators 7" porcelain, coils Hi-Q; will withstand 1 KW. Special pressure clamp construction eliminates messy solder joints. Complete instructions.

and the complete line of hy-gain ANTENNA PRODUCTS!

WORLD RADIO LABORATORIES

"World's Largest Distributor of Amateur Radio Equipt."

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PHONE 2-0277

For further information, check number 37 on page 126.

GET THE MOST CASH When You Sell to W6ATC!

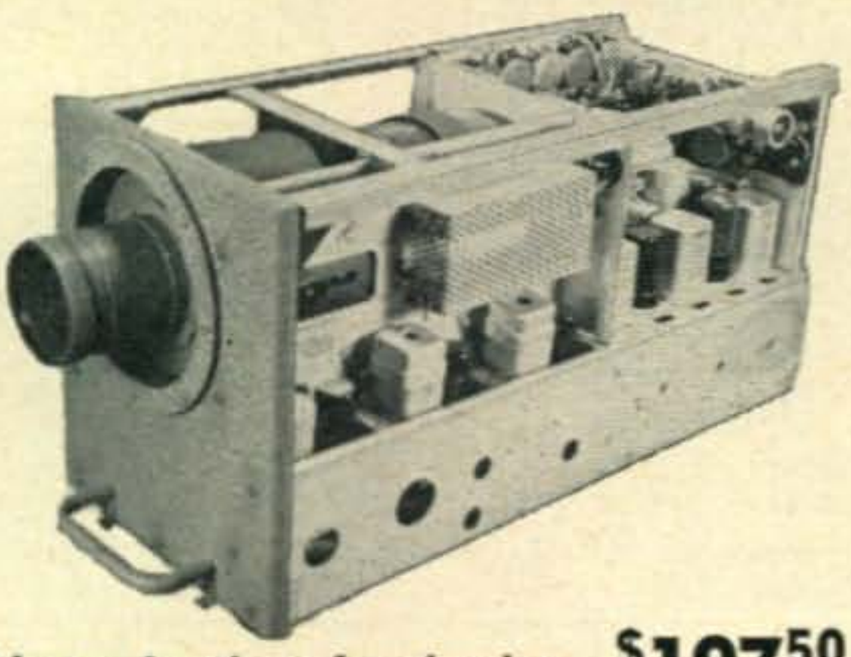
Urgently need and pay top-most prices for the following. Have you any of these?

BC-348 BC-224 R-5/ARN-7 APN-9 ART-13 BC-788C

ALSO: All types of military test and communication equipment: TS, I, AN, AN/UPM-11, TS-147-D, TS-148.

RCA TV CAMERA!

Brand new i s Surplus!



Now sold at a fraction of real value. $197.50

for labs, industry, prisons, TV, medics — 100's of closed circuit TV uses. 1846 iconoscope, 6-stage video amplifier and clipper. Send for complete technical data.....$197.50

ACCESSORIES AVAILABLE: monitor, tripod, power supply.

ALVARADIO INDUSTRIES

P.O. Box 151-CQ No. Hollywood, Calif.

For further information, check number 38 on page 126.

tenna connection on your receiver, either through an antenna switch, or by a jumper wire from antenna to ground. Open the rf gain about half-way. Now press the transmitter key and tune the receiver to your operating frequency. There should be some indication on the S-meter when your receiver tunes through your carrier. Tune the receiver carefully for maximum deflection of the S-meter, adjusting the rf gain so that a reading of about S-9 shows on the meter, since S-9 is a good reference point from which to start. Now tune up the rig. There should be a definite increase in signal strength reading on the S-meter as your rig hits resonance. Back the rf gain off to S-9 again and touch up the transmitter tuning again. Repeat backing off the rf gain to S-9, and touching up the transmitter tuning until there is no further increase in S-meter reading—and there you are—all tuned up! This method of tuning up my rig has been carefully checked against the plate meter in the final and was found to be a more accurate indicator than the plate meter. It is also a great deal more accurate than a neon bulb or pilot light.

R. A. Boyll, W9IFG
Terre Haute, Indiana

Janitor

Dear Janitor:

Congratulations on your new staff position. I hope you get an expense account to handle those who come in with their complaints.

Please do me a favor and have one of your assistants check the circular files for my article about a filament choke for grounded grid amplifiers.

John Wilson, W1JYY
Nashua, New Hampshire

Found it OK. Looks good so I'll get it set in type, the heck with the editor . . . he's off to some damned hamfest somewhere anyway.

Generator

Dear Sir:

I have read with interest the portable A-C Gen. Sync article (pp. 31, Mar. 57). It may interest some of your readers to know that should the occasion ever arise that this same method is used to sync two or more gens to feed the same load. It may be used on single or 3 phase gens and the units are tied together when all the lamps are dark—there being a minimum of current flowing between units in this state. (After sync the speed should be varied to equalize the load current from each unit.)

Also of possible interest to some who may wish to check their portable or emerg gen when no city power is available as a standard freq., is the use of an electric clock (designed to operate on the freq. desired) — preferably with a sweep sec. hand, operating off the A-C gen and checked against a mechanical clock or watch of at least fair accuracy.

For the perfectionists among us the mech. clock standard may be checked with WWV time sigs—(or some other standard time sig source) as it should be anyway for the proper keeping of logs and skeds.
(an error of 1 cps will show up as 1 sec/min—or as 1 min/hr or 24 mins/day—assuming that std 60 cps equipment is used)

Earl W. Ladendorf, W9PZC
Des Plaines, Ill.

I use a calendar for my generator.

Thanks

Dear Wayne:

If I can stop laughing long enough to get this written, I must tell you that you have accomplished the impossible. You have received a letter from me to a magazine editor.

What turned the trick was your snapshot of the CQ lab where "we conduct exhaustive technical evaluations of equipment for our technical reports."

Orchids also to K4HQB for his very humorous article "Simple LFO for the Novice."

Drop your technical articles if you must, discontinue your miscellaneous departments if necessary, but please,

[*Turn next page*]

Contest

[*from page 18*]

Date Oct.	Band Mc.	Time G.M.T.	Station Worked	Serial Sent	Serial Received	Points Claim.	Bonus Points	(Leave Blank)
5th	14	1054	VK2XYZ	57001	54027	5	50	
	14	1100	VK3ABC	54002	44131	5	50	
	14	1110	VK3AXQ	46003	57008	5	—	
	21	1220	VK3AZX	58004	56045	5	50	
	21	1230	ZL2XYZ	56005	57152	5	50	
	21	1257	ZL2ABC	55006	45013	5	—	
	21	1315	VK9XY	57007	58141	5	50	
	21	1405	VK9AB	59008	59016	5	—	
TOTAL (Points Claimed + Bonus Points) 40 + 250 = 290								
[Contestants are requested to maintain "sent" serial numbers in the correct sequence and not to divide their logs into bands.]								

31, 1957 to the W.I.A., Federal Contest Committee, Box 1234K, G.P.O., Adelaide, South Australia.

Notes

You have the new dates of our World Wide DX contest. Rules will appear in our next issue.

Still no answer from the LABRE boys. However we have a feeling that they will hold their affair at the usual time, early in September.

Well, we know of at least one person that reads our column. Just received a letter from Bandi regards our note in the May issue. He is now connected with RCA Communications. The certificate for HA5KBA's efforts in our Phone contest will be sent to him. We will be glad to forward any correspondence to him.

We only just received VQ2AS's log. 48,090 points on 10 phone and 176,540 points on All Bands CW. Nice scores, John, but it was received much too late to be considered for competition. Don't know what could have happened to it.

That's all for this time.

73, Frank, W1WY

Sample Log

VK/ZL DX Contest, 1957

Page 1

Name.....Address.....
Section.....Call Sign.....
.....
.....
Claimed Scores: Total.....
Band Scores: 80 Metres.....
40 " .....
20 " .....
15 " .....
11 " .....
10 " .....
Tx Input Power.....Aerial(s).....

Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the Contest.

Signed .....
Date .....

For further information, check number 39 on page 126.

Do It Yourself

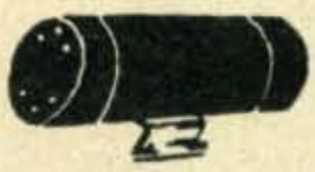
Regdon QRT Conelrad Alarm Kit

Easy to assemble. Meets full FCC requirements. Converts any inexpensive AC-DC receiver having AVC into Conelrad alarm system. Both visual and audio alarm. Complete with tubes & instructions.
Amateur Net $16.50

"Wonder Bar" 10 Meter Antenna

As featured in Nov. 1956 QST. Complete with B&W 3013 Miniductor. Only 8 feet long for 10 meters.
Net.....$6.95

6 Volt Dynamotor



Rated output: 425 V. DC at 375 ma. High efficiency, compact. 4" diameter, 7½" long. Shpg. wt. 13 lbs. Worth 2 to 3 times this low price..... **$12.95**

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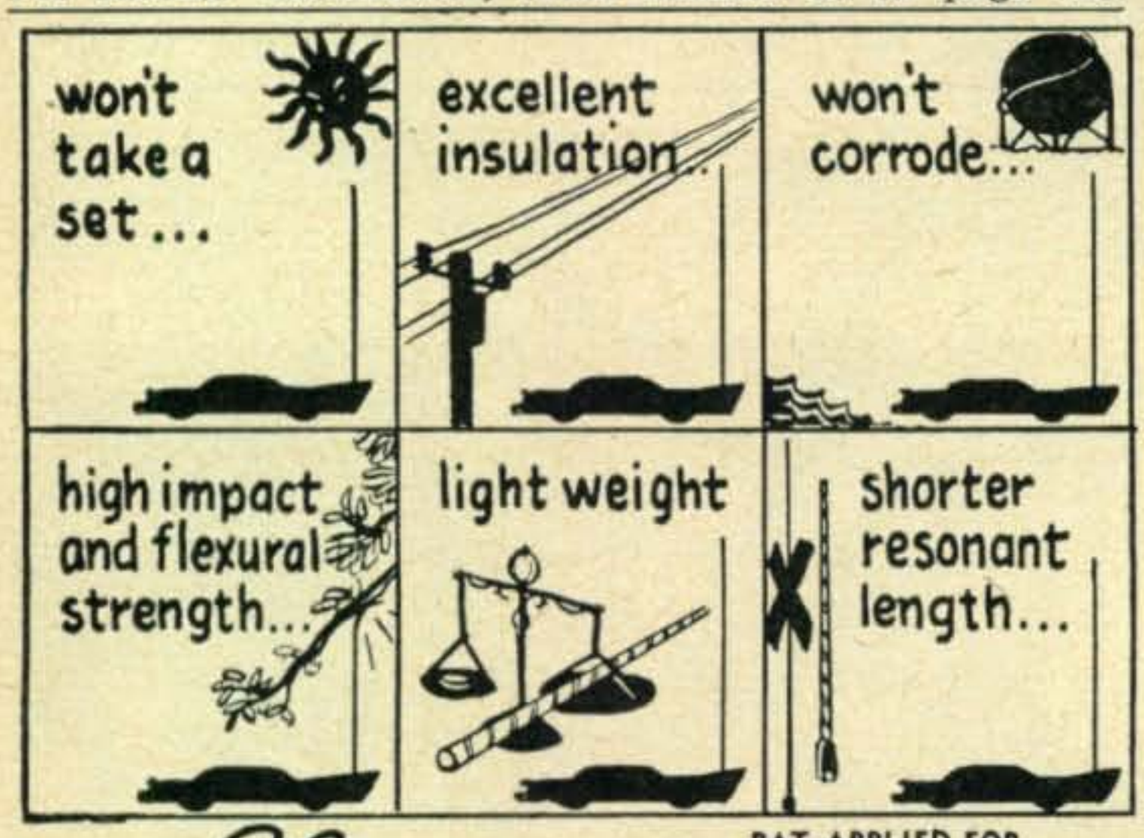
ARROW ELECTRONICS INC
65 Cortlandt Street, N. Y. 7, N. Y.
DIgby 9-3790
525 Jericho Tpke. Mineola, L. I., N. Y.
Ploneer 6-8686

For further information, check number 40 on page 126.



PAT APPLIED FOR
Shakespeare WONDEROD
Fiberglass Whip Antenna

- *made by the pioneer manufacturer of fiberglass fishing rods*
- *industrial applications solicited*
- *standard whips — 54" to 60", $5.75*
  61" to 90", $6.95
  base extensions with .500" dia. —
  18", $4.80; 27", $5.48; 36", $5.82
  3/8" — 24 thd. base fittings
  — prices amateur net

COLUMBIA PRODUCTS CO.
Subsidiary of Shakespeare Co.
P. O. BOX 5207, COLUMBIA, S. C.

For further information, check number 41 on page 126.

PLEASE don't ever lose your sense of humor. Thanks a million for all the belly laughs!

A. P. Jones, K4GZT
High Point, N. C.

Hey there Jones, you got to laughing so hard you forgot to send money for a globe, atlas, subscription or something.

160/M

Dear Wayne:

Just thought I'd send you the enclosed picture that I made of Larry Chilton, W5THI, a few days ago. 160

meter mobile antenna does not come the easy way. Hi. The top loading coil with antenna is a TEXAS made "BZO" and also used are two B&W 3906 and one 40 meter master mobile coil.

R. H. "Bob" Williams, W5AXO
Fort Worth, Texas

A real coily—(Hi) Q deal.

Dear Sir:

This letter accompanies a photo of our station which some of our friends have prevailed upon us to send

ONE DAY Processing!

FOR AMATEURS — EXPERIMENTERS 1500 KC to 90 MC

Wire mounted, plated crystals for use by amateurs and experimenters where tolerances of .01% are permissible and wide range temperatures are not encountered.

CIRCUIT: Designed to operate into a load capacitance of 32 mmf on the fundamental between 1500 KC and 15 MC. Designed to operate at anti-resonance on 3rd overtone modes into grid circuit without additional capacitance load. 5th overtone crystals designed to operate at series resonance. *(Write for recommended circuits.)*

Prices Pin Diameter .093 Pin Spacing .486 (FA-9 Fits Same Socket as FT-243)

Frequency Range	Tolerance	Price
1500-1799 KC	.01%	$4.50
1800-1999 KC	.01%	4.00
2000-9999 KC	.01%	3.00
10000-15000 KC	.01%	4.00

Frequency Range	Tolerance	Price
Overtone Crystals — 3rd Overtone Operation		
15 MC-29.99 MC	.01%	$3.00
30 MC-54 MC	.01%	4.00
Overtone Crystals — 5th Overtone Operation		
55 MC-75	.01%	4.50
76 MC-90 MC	.01%	6.50

ONE DAY SERVICE! Crystals are sold direct, for fastest possible service. When cash accompanies order, International prepays Airmail postage; otherwise, shipment made C.O.D. Specify exact frequency and crystal will be calibrated to .01% or better of this frequency.

COMMERCIAL Precision Crystals F-6 Series 1500 KC - 50 MC

NOTE: The FA units will not necessarily have the correct correlation for Commercial use.

For Commercial applications, the F-6 type unit should be used. Write for details!

FREE CATALOG!

Ask for your copy of New 1957 Catalog showing the International complete line. Crystals available from 100 KC to 100 MC.

International CRYSTAL MFG. CO., INC.

18 N. LEE PHONE FO 5-1165 OKLAHOMA CITY, OKLAHOMA

For further information, check number 42 on page 126.

MECHANICAL ENGINEER

Electro-Mechanical design and packaging heat transfer, shock and vibration, materials and finishes, etc.

SENIOR PROJECT ENGINEERS

Capable of Receiver and Transmitter work through 500 megacycles.

LABORATORY TECHNICIANS

To work with senior project engineers on projects through 500 megacycles.

PRODUCTION ENGINEERS

Coordination between development lab and production department. Must have background and experience in electronic engineering, and have intimate and comprehensive knowledge of production fabrication methods.

Moving expenses paid; group life insurance; Plant located in San Fernando Valley adjacent to Los Angeles. Send complete resume including photograph, etc., in first letter. Communications held in strict confidence.

Address reply to the attention of

W. W. Smith, Director of Engineering
GONSET DIVISION of L. A. Young Spring & Wire Corporation
801 South Main Street Burbank, California

For further information, check number 43 on page 126.

FORT ORANGE
Radio Distributing Co.
904 BROADWAY, ALBANY 4, N. Y., U.S.A.
AMATEUR HEADQUARTERS

Uncledave is back from his round-the-world trip. He's rarin' to go, so quick see Uncledave W2APF for the best deal!

NEW GEAR

Gonset 77 Xmtr	$289.50
Gonset 66 Rcvr	254.00
Nat'l NC66 Ptble Recvr	129.50
Johnson 500 w/t	879.50
Johnson 500 kit	699.50
Hallicrafters HT32 xmtr	675.00
Hallicrafters HT33 amp	775.00
Hallicrafters SX101 rcvr	395.00
Collins 75A4 Receiver	695.00
RME 4350 Receiver	229.00

GUD USED GEAR

Johnson Viking II	$225.00
Gonset 3025	150.00
Gonset 3026	175.00
Heath AT-1 Xmtr	29.95
Heath AC-1 Coupler	9.95
RME 84 Receiver	69.95
Johnson Viking I	175.00
Hallicrafters S38D	39.95
Hallicrafters SX62A	275.00
Hallicrafters SX42	175.00
Hallicrafters SX71	150.00

Write for complete list R

WE SPECIALIZE IN FOREIGN TRADE

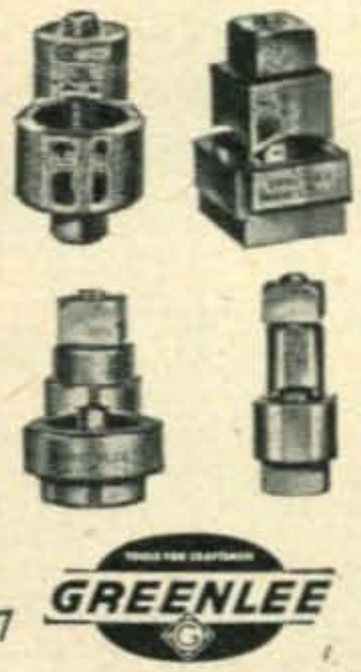
For further information, check number 44 on page 126.

CUT CHASSIS HOLES FAST!

ROUND SQUARE KEY "D"

Smooth, accurate openings made in 1½ minutes or less with Greenlee Radio Chassis Punch

Quickly make smooth, accurate holes in metal, bakelite, or hard rubber with a GREENLEE Chassis Punch. Easy to operate . . . simply turn with an ordinary wrench. Round, square, key, and "D" types . . . *wide range of sizes* to make openings for sockets, plugs, controls, meters, terminal strips, transformers, panel lights, etc. Assure perfect fit of parts and professional finish to every job. Write for descriptive literature. Greenlee Tool Co., 2367 Columbia Ave., Rockford, Ill.



GREENLEE

For further information, check number 45 on page 126.

in to you for your use of publication if you so desire. If you do use this picture, would you please credit our son, David Brown, who shot it? Thanks.

Station is combination of W6BZF/W6KAB, and comprises a Viking Valiant either as direct transmitter or may be switched to drive any of four 1-KW final amps (6 later) with 1 KW to PP 250THs. Modulation is PP-304TLs with Reinartz Positive Peak Extender ckt and Splatter choke in Class C lead.

Receiver is National 183-D. Thank you kindly.

Mrs. Bonnie Brown, W6KAB
Mr. Ben C. Brown, W6BZF
Pasadena, Calif.

GDO

Dear Sir:

In the June 1956 issue of CQ, Page 30, you had an article using the GDO as a crystal oscillator.

I have found that this works very well with most of my crystals around the 80 meter band, but I cannot get it to work with a 200 kc crystal or a 20 mc crystal. I wonder if it is supposed to work with these particular frequencies or if some additional circuitry should be built into the adapter. Your information on this would be appreciated.

T. A. Crowther
249 Pearsall Avenue
Ridgewood, New Jersey

How about some of you fellows operating on 200 kc and 20 mc letting T.A. in on your tricks. How is 200 these days?

So, You Don't Know Antennas!

1. Beverage (Ha! You missed that one, eh?); 2. Ground Plane (no excuse for missing that one); 3. Extended Double Zepp (you didn't really call that a dipole, did you?); 4. Hertz (sure, it's a dipole, but that isn't a fellow's name); 5. Folded Dipole. 6. Adcock (this one might be called a Kraus 8JK); 7. Rhombic; 8. Sterba; 9. Lazy H; 10. Marconi (old 160 meter men should know that one); 11. Cubical Quad (well, it might be a bi-square); 12. Yagi (did you spell it right?); 13. Franklin (look, we know you missed that one); 14. Zepp; 15. V.

Are Youse Subscribed?

Next month CQ's newstand distribution will shift to a new company. Heaven only knows where you will be able to find copies. Why not depend upon good old dependable inexpensive Uncle Sam to get you the August and following issues. Besides it is cheaper.

CIRAP

Central Illinois Radio Amateur Picnic July 21: 10th annual *FREE* Hamfest. New location this year. Illinois Memorial 4-H camp at Robert Allerton Park. Located two miles south of Highway 47 midway between Decatur and Champaign, Illinois. Transmitters on 3885KC and 28,560KC or follow hamfest signs.

Tri-State

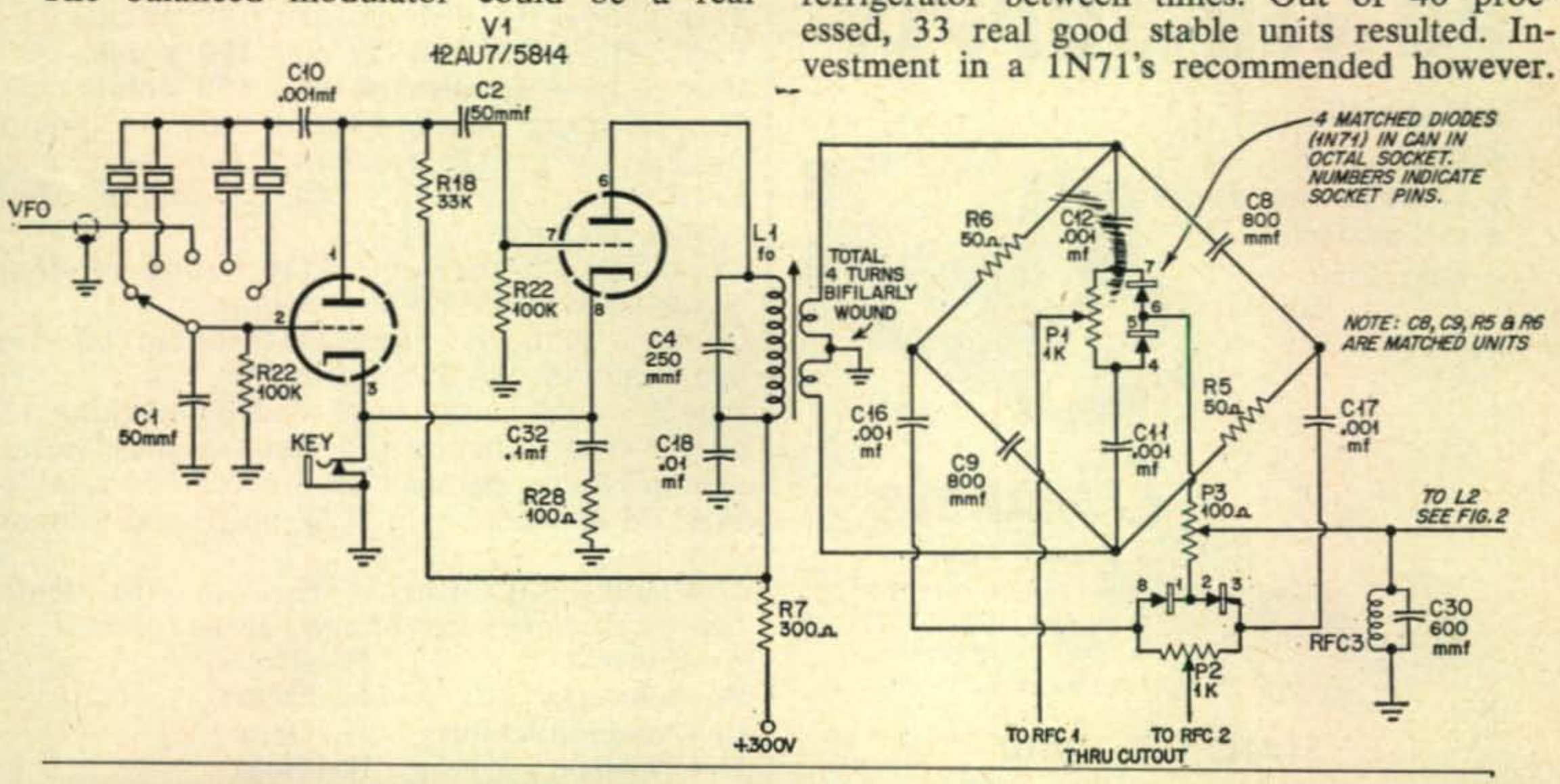
The Annual Hamfest of the Tri-State Amateur Radio Society will be at Bauer's Grove, north of Evansville, Indiana, on Sunday August 25, 1957. Plan for a day of contests, prizes and games for the entire family beginning about 10:00 AM CDT. Directions will be furnished by signs on U. S. Highway 41 and by radio on 75, 10 and 6. Advance registration may be made by sending $2.00 to Paul Wurtz, 810 South Governor Street, Evansville, Indiana, prior to August 17, 1957. Registration at the gate will be $2.50.

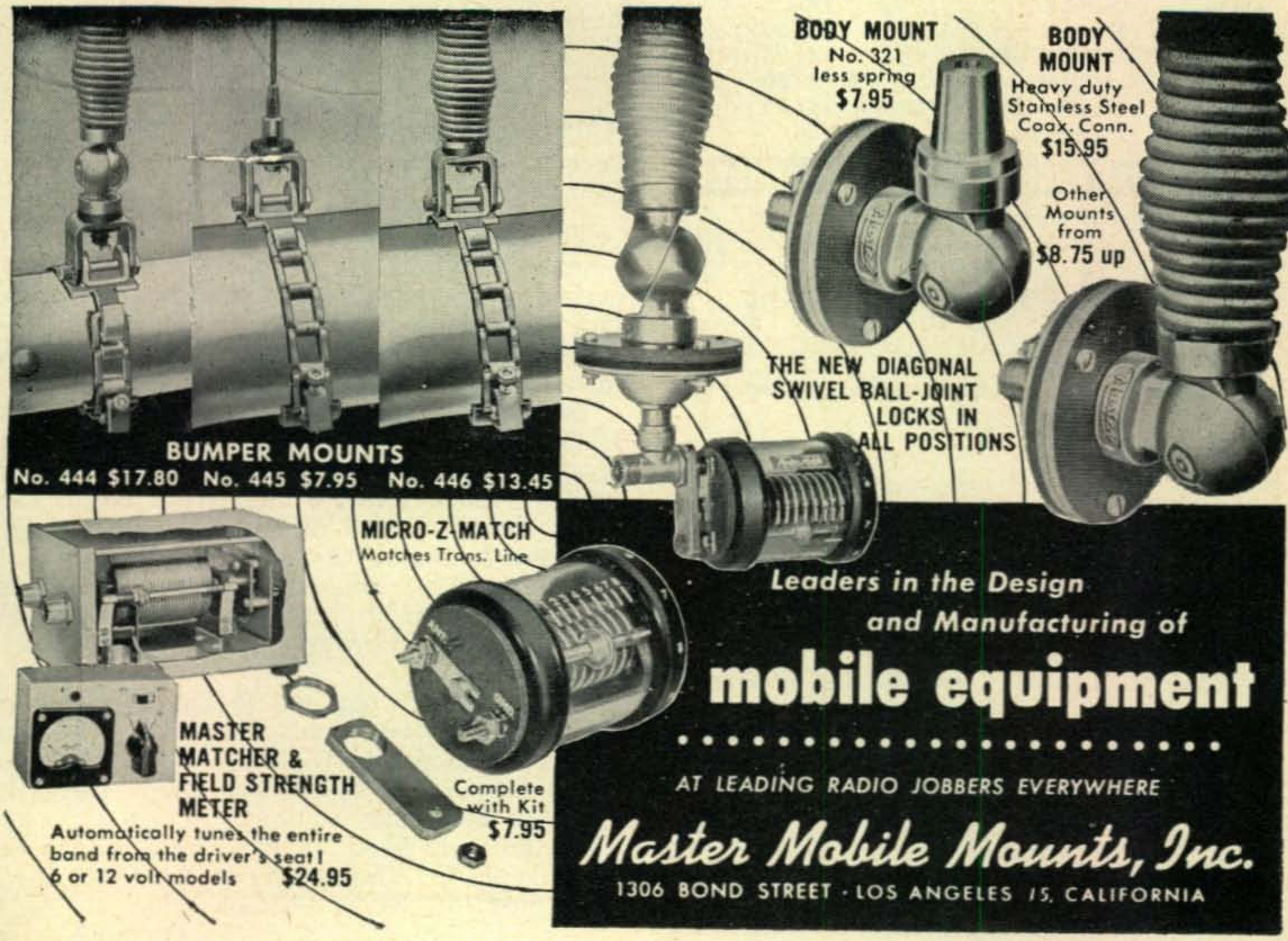
Correction: Hi Power Mobile—May, 57

The switch on page 102 now labeled Rec and Send should read
"Operate" in the upper position
"Tune" in the lower position.

On the schematic shown on page 47 a few parts were left out. The correct schematic is shown with the corrections indicated thereon. The parts list is correct as shown in the May issue.

The balanced modulator could be a real dog to balance. On the first version as soon as potential was applied or heat radiated from the adjacent tubes it was hard to tell which way the balance would go. The matched diodes (in static state) didn't stay matched in operation. One problem was in attempting to make the 1N71's instead of buying them. The problem was finally resolved by taking a set of 40 1N34's and alternately baking and freezing them. When the wife baked a pie or cake the diodes went in the oven (250°), resting in the refrigerator between times. Out of 40 processed, 33 real good stable units resulted. Investment in a 1N71's recommended however.

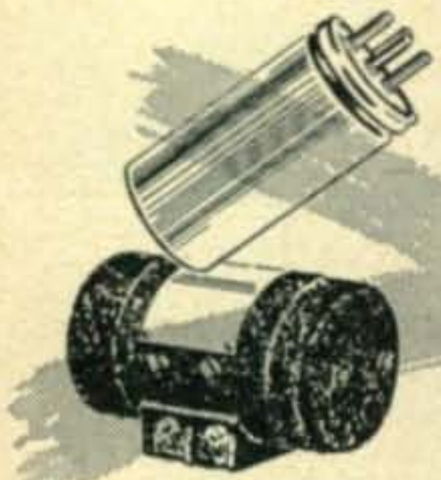




For further information, check number 46 on page 126.

Telecom TRANSISTOR MOBILE POWER SUPPLY

- high efficiency
- lightweight
- space-saving design
- self-protecting
- long life



Eliminate

- starting surges
- mechanical vibration
- moving parts
- costly maintenance
- radio noise

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INPUT	OUTPUT	PRICE
12 VDC	500 VDC @ 225 ma.	$68.50
12 VDC	250 VDC @ 100 ma	44.95
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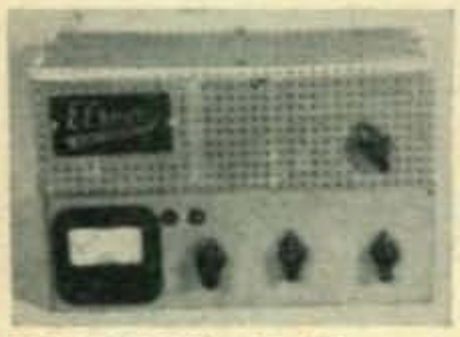
AVAILABLE THROUGH YOUR HAM JOBBER

For further information and prices, write to Telecom, Inc., 1019 Admiral, Kansas City, Mo.

Telecom INC.

Automatic Communications Equipment

For further information, check number 47 on page 126.



Six Meters Transmitters by

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for Mobile or Fixed

FEATURES: 25 Watts Input to Push-Pull Final • 832-A Final Hi-Level Plate Modulation • Physical Size, 5 x 9½ x 6 • Built In Meter • Meter Switching • Switching for Carbon or Crystal Mike • 6-12V. Switching • Tuned Output for 50 to 70 Ohm Line • Power Requirements, 6V. @ 4.4A. or 12V. @ 2.2A. and 400V. @ 200MA. **TUBES:** 12AX7 Speech Amp., 2-6V6GT. Modulators, 2-5763 Osc.-Mult., 832-A Final Amp. Above Model RGE-11-A Factory Wired and Complete with Tubes—Power Plugs..... **$69.50**

Matching 110V. Power Supply..... $39.50

Other Products — Write for Information

E L S P E C 3335 STELZER ROAD COLUMBUS 19, OHIO

DX [*from page 96*]

. . . G2HKU seeks Utah, Nevada and Wyoming—help? . . . G3AAE seeks present whereabouts of WØOZW/KS6 on 1947 . . . KV4AA was happy to log visits from W1DKI, W2YCX (yl) and ex-OZ1KJ . . .

WADM Certificate

(Worked all DM, East German, Districts)

This Award is available in four parts.

Part IV — 10 districts and 20 points.
Part III — 13 districts and 40 points.
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Non-European stations need only 14 points for Part IV and 28 for Part III.

Each contact on 3.5, 7, 14, 21 and 28 Mcs. counts one point.

Contacts with the same DM station on four bands allows you 4 bonus points.

Contacts with the same DM station on five bands allows you 5 bonus points.

Part I would be accomplished by working 15 districts on 5 bands (75 points) plus "same station" bonus points (75) for the 150 total.

WADM is available in "CW only" and "Phone only."

DM-land has 15 districts which may be identified by the *last* letter of the call as follows:

A—Rostock
B—Schwerin
C—Neubrandenburg
D—Potsdam
E—Frankfurt/O
F—Cottbus
G—Magdeburg
H—Halle
I—Erfurt
J—Gera
K—Suhl
L—Dresden
M—Leipzig
N—Karl-Marx-Stadt
O—Berlin

Apply to: **G.S.T. Neuenhagen/Berlin, Langenbeckstr. 36-39, East Germany.**

Mile-Hi Award

The Denver, Colorado, Radio Club, Inc. announces the MILE-HI AWARD. This engraved certificate is available to *all* amateurs who contact 25 stations located in the Denver Metropolitan Area. 10 of these contacts must be with members of the Denver Radio Club.

In addition to the certificate all stations OUTSIDE of North America are eligible to receive a one year's subscription to either CQ or QST. Such stations should not be in the area between 52 and 165 degrees West Longitude and North of 12 degrees North Latitude.

Renewal subscriptions can be won by eligible stations who can furnish the necessary amounts of contacts with Denver stations not previously submitted.

Applicants are required to have QSL'ed to all Denver stations contacted and application should contain list of all contacts with time and date. This will be checked against the QSL cards at the Denver stations.

All amateur bands may be used, phone or CW. Apply to: The Denver Radio Club, Inc., P. O. Box 356, Denver 1, Colorado.

73, Dick, KV4AA

Quality Built
2 AND 6 METER CONVERTERS

XC-144

Two Meter grounded grid 417A Crystal Controlled Converter. 2.8 db Noise figure, 33 db Power gain, 60 db Image rejection, 80 db I. F. rejection and 80 db down on all other spurious responses. XC-144 output 14 to 18 mc.
Price **$79.95**

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Six Meter Double Cascode Crystal Controlled Converter. 4 db Noise figure, 33 db Power gain, 90 db Image rejection, 80 db I. F. rejection and 80 db down on all other spurious responses. XC-50 output 14 to 18 mc: XC-51 output 10 to 14 mc.
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Other Models:

XC-144-C output . .	26 to 30 mc.
XC-144-N output . .	30 to 34 mc.
XC-50-C output . .	26 to 30 mc.
XC-50-N output . .	30 to 34 mc.

Ask your dealer or write to **TAPETONE, INC.**
10 ARDLOCK PLACE, WEBSTER, MASS.

For further information, check number 48 on page 126.

INCREASE THE EFFECTIVENESS OF YOUR RIG WITH . . .

SAXTON

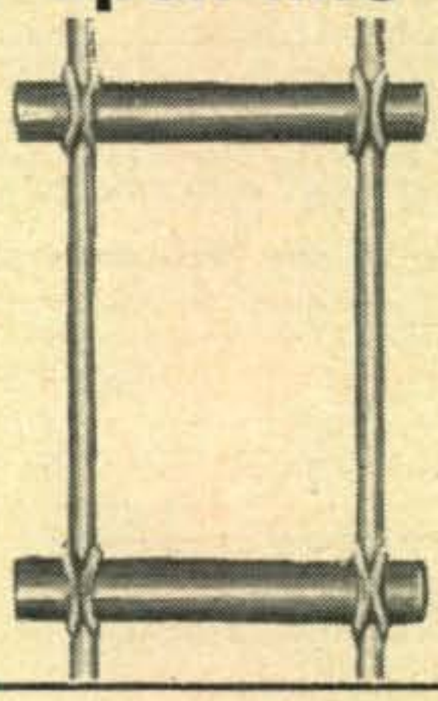
For consistent DX-SAXTON lo-loss open line Xmission wire delivers more RF *than any other Xmission wire*. Here's Proof!

db loss per 100 ft.

type	100 mc. wet	100 mc. dry	500 mc. wet	500 mc. dry	1000 mc. wet	1000 mc. dry
600Ω open wire	—	.19	—	.42	—	.89
450Ω open wire	—	0.35	—	0.78	—	1.1
300Ω open wire	1.20	0.40	2.30	0.80	1.9	1.8
300Ω tubular	2.8	1.1	6.8	3.1	10.2	4.8
300Ω flat	7.6	1.5	20.0	3.2	30.0	5.0
RG-59U	—	3.8	—	9.4	—	14.2
RG-11U	—	1.8	—	5.0	—	7.6

3 types available — various gauges and impedances
4 spool sizes—no waste—no deterioration—lasts forever!
–Write for illustrated catalog showing our complete line.–

lo-loss open line



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SAXTON PRODUCTS INC. dept. 3
1661 Boone Ave. New York 60, N. Y.

For further information, check number 49 on page 126.

FREED

MIL-T-27A POWER & PULSE TRANSFORMERS

FOR IMMEDIATE DELIVERY FROM STOCK

POWER TRANSFORMERS

Cat. No.	Hi Volt	DC Volts	DC Amps	Filament V 1	Amp.	Filament V 2	Amp.	Case Size
MGP1	400/200 ct	185	.070	6.3/5	2	6.3	3	HA
MGP2	650 ct	260	.070	6.3/5	2	6.3	4	JB
MGP3	650 ct	245	.150	6.3	5	5.	3	KB
MGP4	800 ct	318	.175	5.	3	6.3	8	LB
MGP5	900 ct	345	.250	5.	3	6.3	8	MB
MGP6	700 ct	255	.250					KB
MGP7	1100 ct	419	.250					LB
MGP8	1600 ct	640	.250					NB

PULSE TRANSFORMERS

Cat.No.	Block'g. Osc.	Int. Coupl'g.	Low. Pow. Out.	Pulse Voltage Kilovolts	Pulse Duration Microseconds	Duty Rate	No. of Wdgs.	Test Volt. KVRMS	Char. Imp. Ohms
MPT1	V	V		0.25/0.25/0.25	0.2-1.0	.004	3	0.7	250
MPT2	V	V		0.25/0.25	0.2-1.0	.004	2	0.7	250
MPT3	V	V		0.5/0.5/0.5	0.2-1.5	.002	3	1.0	250
MPT4	V	V		0.5/0.5	0.2-1.5	.002	2	1.0	250
MPT5	V	V		0.5/0.5/0.5	0.5-2.0	.002	3	1.0	500
MPT6	V	V		0.5/0.5	0.5-2.0	.002	2	1.0	500
MPT7	V	V	V	0.7/0.7/0.7	0.5-1.5	.002	3	1.5	200
MPT8	V	V	V	0.7/0.7	0.5-1.5	.002	2	1.5	200
MPT9	V	V	V	1.0/1.0/1.0	0.7-3.5	.002	3	2.0	200
MPT10	V	V	V	1.0/1.0	0.7-3.5	.002	2	2.0	200
MPT11	V	V	V	1.0/1.0/1.0	1.0-5.0	.002	3	2.0	500
MPT12	V	V	V	0.15/0.15/0.3/0.3	0.2-1.0	.004	4	0.7	700

ALSO AVAILABLE — Military Standard Filament and Audio Transformers.

Send for NEW 48 page transformer catalog. Also ask for complete laboratory test instrument catalog.

FREED TRANSFORMER CO., INC.

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For further information, check number 68 on page 126.

Autenna **REMOTE TUNING MOBILE ANTENNA**

CHANGE BANDS WHILE DRIVING

Positive band changing—meter instantly identifies band antenna is tuned to 75-40-20-15-10 meters. $69.95 Amateur net. Also Manual Mobile Antenna that locks on band for positive tuning. Only $21.95 Amateur net.

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Editorial [*from page 12*]

torpedoes which we had been all set to shoot at each other. We came alongside and swapped some hydraulic oil for some sugar and then went about our business. Later, at a rest camp on Majuro, I looked up the other radar operator and found that he also was a ham. Few radar operators knew the code and it was just a lucky coincidence that two hams happened to be on hand.

I am sure that almost every other op can come up with a similar story of some time when cw was of vital importance.

Technicians on Eleven? Come on fellows, get that 13 per.

Hassle

In my May editorial I passed along an interesting legal point furnished by Reuben Gross W2OXR, a lawyer, clarifying things somewhat with regard to third party traffic restrictions. In his letter he mentioned that he had informed the ARRL of this legal point and that their attitude was that he should not make the information public since this would just result in further future regulations which would close the legal gap.

While this was a possibility, I could not see what we really had to lose as the worst that would happen would be that we would eventually be back where we thought we were before. On the other hand we would have a year or two to perhaps show some of the fearful foreign countries that they really had little to worry about from amateur radio handling of third party traffic. The end result could then possibly be a lifting of all restrictions on third partying. There didn't seem to be much of a gamble since we had nothing to lose.

I was a bit disturbed at the ARRL attitude that some things are better kept secret from the amateurs, I favor an open discussion of things with all factors being presented for the interested to read and consider.

The world has changed tremendously since the international regulations were made back in 1932, revised in 1937, and reaffirmed in 1947. That there has been a change is obvious when you see the rapidly growing list of countries who have gone to the trouble to make special treaties with the U.S. to specifically permit third party traffic. Amateur radio has handled itself well and with great public service during the last ten years and third party traffic has taken on a whole new concept. The hundreds of thousands of messages and phone patches that were handled for overseas military personnel back in 1947-8-9 showed the world what could be done with ham radio. This was a bonanza for the phone companies and wire services for though they may have lost a small revenue on overseas calls they reaped it in on toll calls and telegrams within the country.

Ask any ham operator who does much phone patching how much of his work is over long distance wires.

The whole concept of limiting amateur radio third party traffic seems to me to be one of a bygone era. But, neglecting all that for a moment, let us take a look at the point that has been raised. The regulations say that amateur radio stations are not to be used to transmit messages internationally on behalf of third parties. OK. But there is nothing said about receiving messages for a third party. Some foreign countries may have regulations to this effect, but in this country there is no such limitation. Since reception is not a licensed activity in this country there is reason to question the juristriction of the FCC to prohibit such activity if they wanted to. They can't stop you from *listening*.

Ack, W4ECI, gets hold of KV4AA for Danny (right) to check up on his speaking schedule. Ack and his wife kindly put us up during our two day stay in Birmingham. Sure, that is the KWS-1 and 75A4 . . . Ack is the local Collins dealer: Ack Radio Supply Co.

Panic

Those teevers among you may have caught the June 11th Panic show on NBC which featured a paraplegic amateur trapped in a burning house, see cut below. I would like to

2-Meter Model . .$165.00
6-Meter Model . . 165.00
10-Meter Model . 165.00

BLACK WIDOW RECEIVER-TRANSMITTER

Calibrated VFO, plugs into xtal socket. Specify freq. band . . . . . .$12.50 Every model wired for 6 and 12 volts.

Small size and low cost because you use your present car radio speaker and your own 250-300 V., 180-200 ma power supply. Hangs under your dash. Only 5" high, 6" deep, 9" wide. The Black Widow is a very hot 15-tube set with **separate** supersensitive, superselective superhet receiver built into the same case with the transmitter which puts 8 W into the air.

RECEIVER: Low-noise cascode RF stage and double-conversion (6 mc and 1500 KC). IF's. Oscillator stabilized by VR tube and balanced-coefficient matched capacitors. Very-high-Q IF's. 5687 output. Has AGC, very effective noise limiter, and an S-meter. Easy Vernier tuning.

TRANSMITTER: 2E26 output driven by 5763. Link coupled and matched exactly to 52 ohms with no filter insertion loss. 6U8 xtal oscillator uses stable, dependable overtone circuit. Multiplier and output tank use balanced-coefficient matched capacitors for absolute stability. Includes built-in press-to-talk changeover relay. The S-meter switches to become efficient tune-up meter. Crystal or VFO plugs into front panel for easy frequency change.

MODULATION: Switch selects either carbon mike or high-Z mike, either crystal or dynamic. 6AU6 preamp. 12AU7 phase-inv./ampl. drives P-P 6AQ5s which plate-modulate the final. 100% modulation with no splatter!

Here you have a completely built and tested master-engineered set. Engineers analyzed, improved and miniaturized the best of the 1957 sets and added 1958 improvements gained through their personal experience in current military design.

BE THE PROUDEST MOBILE AMATEUR IN TOWN WITH THE BLACK WIDOW!

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WE ALSO WANT—COMPLETE OR PARTS:

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For further information, check number 52 on page 126.

THE RADIO BOOKSHOP

extends its dying admiration for the remarkable restraint you have shown in answering its ads (page 24 May CQ, page 117 June CQ). We're willing to let bygones be bygones if you come across this month.

SOS AT MIDNIGHT

by

WALKER TOMPKINS

K6ATX

Exciting ham radio adventure story for boys. Every amateur will want this for his and the neighbors kids. Only

$2.75

Radio-Television & Basic Electronics by R. L. Oldfield . . . $4.95

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Radio Operating Questions and Answers by Hornung & McKenzie . . . $6.00

If you didn't cheat too much on your ham exam then you should be able to get one or two commercial tickets. This book helps you, covering radio law, theory, and operating practice for all grades of commercial licenses. Better get that ticket today so you'll have it when you need it. This book is the twelfth edition and is right up-to-date. How are you going to get rich in electronics if you don't even have a license? 571 pages.

I, Libertine by Frederick R. Ewing (alias for K2ORS) . . . 50¢

The October 1956 CQ Editorial told all about this novel, which has since become a best-seller. In case you haven't been able to find a copy at your local Whalens then you may succumb to our mulcting and pay up 50¢ for a 35¢ book. We have no conscience about things like this. There isn't any postage money in that 35¢ price either. Tell you what, if you get that Hornung and MvKenzie book we'll throw in *I. Libertine* free of charge.

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take space to commend the Gonset Company for taking the initiative and expense to alert everyone about this program, even though their equipment was not featured.

Since the Birmingham gang gave me such a wonderful time I am going to take some space to print some of the photos that I took down there of the group that gathered after the Dutch Dinner on Saturday night. Camera bugs will be interested to know that I took these shots with a Retina IIIc using Tri-X film under existing light (no flash).

Next Month we will have a special DX issue for you with feature articles on: Antarctica, Spitzbergen, Yugoslavia, Tortola, Zanzibar, and Catalina. Get out your galoshes.

MSSM, Wayne

Now . . . transmitter tracks automatically with receiver

Plug new V-F-O-Matic into Collins receiver . . . automatically keeps Xmtr zeroed to receiver frequency

NEW V-F-O-MATIC . . . plugs into 75A-2, -3, -4 Collins receivers; requires no rewiring or changes; does not affect calibration, sensitivity or adjustments. Collins precision VFO furnishes freq. control for both send and receive. For all SSB phasing type exciters (10A, 10B, 20A, Phasemaster, Hallicrafter HT-32, etc.) using 9mc mixer frequencies. Automatically zeros in Xmtr to exact freq. received. Operates both upper and lower SB on 75 and 20 meters. Complete with power supply. (Model 80-10 all-band unit for KWS-1 also available.) Immediate delivery.

PRICE $124.50
($14.50 down; $10.50 per month)

SATISFACTION GUARANTEED

LA-400-B LINEAR AMPLIFIER . . . simplified multiband operation on 75 thru 10 meters. Improved TVI suppression. New metering circuit reads RF voltage input, plate current and RF amps output. Low Z, untuned, 400-watt P.E.P. input with more stability, better linearity, only 20 watts drive. Pi-net output. Designed around four Modified 1625 Tetrodes. Especially effective for SSB; also delivers high quality signal on AM, PM, CW. Ideal for portable use. Complete with power supply and tubes. Teams well with V-F-O-Matic.

PRICE $199.95
($19.95 down; $16.50 per month)
ALSO AVAILABLE
Modified 1625 Tetrodes $3.75 each

SATISFACTION GUARANTEED

P & H ELECTRONICS • 424 Columbia, Lafayette, Ind.

For further information, check number 53 on page 126.

Be Right on Top

imported from England

$95.00 net in Canada

with the NEW PANDA

GLOBEMASTER

3-BAND MINIBEAM!

★ Three Bands 10, 15, and 20 meters
★ One Beam
★ One Feed Line

Savard is the exclusive Canadian distributor of this world-famous imported Panda Minibeam.

We carry parts and accessories.
Write today for catalog.

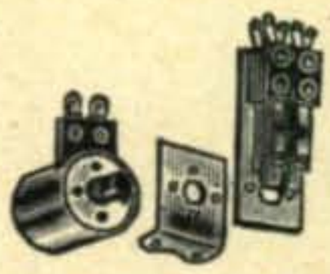
SAVARD RADIO CO.

910 Bleury **Montreal 1, Canada**

For further information, check number 54 on page 126.

New DOW KEY Relays

Multikit Series DKPK



with interchangeable coil and contact assembly, the new series offers a versatile relay of unusually high quality. A.C. types entirely free of hum or chatter.

COILS

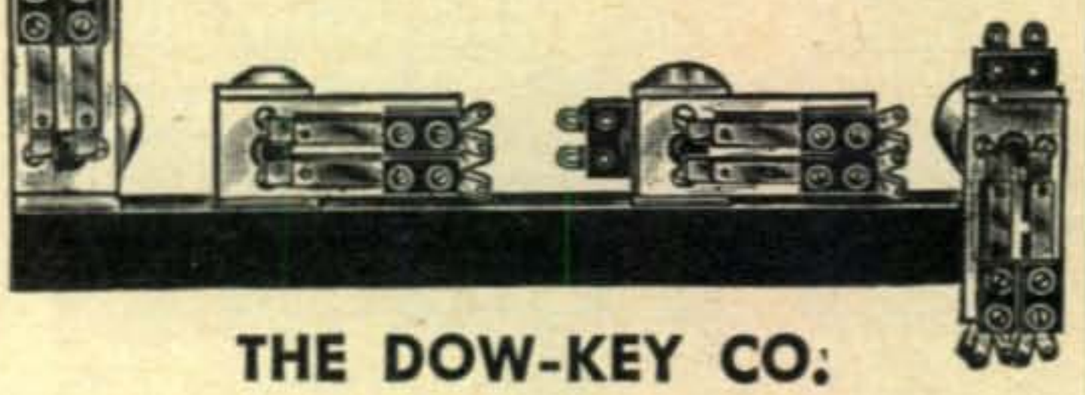
6, 12, 24 v. a.c.	$1.85	6, 12, 24, 48 v. d.c.	$1.85
110 v. a.c.	2.20	110 v. d.c.	2.75
220 v. a.c.	2.85		

CONTACT ASSEMBLIES

SPDT 10 amp. . . . . $1.65 DPDT 15 amp. $2.25

See your distributor. If he has not yet stocked Dow DKPK series relays, order from factory. Send check or money order or will ship C.O.D. Prices net F.O.B. Warren, Minn. Shipping weight 5 oz. Dealers' inquiries invited. Literature on request.

(4 of 7 possible mounting positions)



THE DOW-KEY CO.

BOX 57G **WARREN, MINNESOTA**

For further information, check number 55 on page 126.

The PALCO BANTAM 65

The smallest, most compact MOBILE TRANSMITTER with 65W-Phone 90W-CW

The PALCO "BANTAM 65" is only 4" high, 8" wide and 8¾" deep—can be mounted right at your finger tips—leaves you lots of leg room. The separate modulator chassis is only 2" x 2⅝" x 11"—mounts in any out of the way location. Exclusive new tune-up meter designed with HIGHWAY SAFETY in mind. No more stooping, no squinting. You'll like this new idea!

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- Complete bandswitching 10 thru 80 meters.
- VFO and exciter stages gang tuned.
- Efficient PI-section output.
- Provisions for mounting coax relay.
- Separate inputs for high impedance or carbon mikes.
- Breakin CW operation. Push to talk phone.
- ABI modulation with speech filter and negative peak clipping.
- Makes an ideal NOVICE transmitter.

"BANTAM 65" complete with tubes and power connectors $159.50

For additional information, see your distributor or write

PALCO ENGINEERING CO. FRANKFORT, INDIANA

For further information, check number 56 on page 126.

A CUSTOMIZED SERVICE FOR THE RADIO AMATEUR

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Plain Talk [*from page 56*]

antennas. The theory works all the time. He just doesn't have the antenna the theory is talking about. Most of the directive patterns you see in the handbooks are for an antenna remote from the earth. And when they say remote they mean RE-mote. The ground has considerable effect on ham antennas below 30 megacycles because we don't get 5 or 6 wavelengths from ground. What this means is that the directivity pattern is not ideal, the impedance at the center is probably not 72 ohms, and the angle of radiation is most likely not what we would like it to be. Also you don't have a perfectly conducting ground under it and you may get combinations of effects that would defy description.

So there you have it. I don't expect this will help anyone put up an antenna, but I hope it will help someone decide which formula they want to look up and give them something to argue about when they get on the air. ■

Farm [*from page 57*]

tho—the ground was too wet and they would have trouble getting the big lift-truck across the yard.

Monday, I went to school, and when I came home for lunch—whataya think? My beam was sitting forty feet up in the air, pretty as a picture, with only foot deep ruts across the yard to tell how it had got there. That night some friends and I connected the guy-wires. Then I put my foot on the first step and started up. The steps were so darned far apart that I could hardly reach them. I made it, tho, and connected the second set of guys.

The next day after school, Bill Brown and I prepared the motor control lines—two 100 ft. lines of Romex and 100 ft. of guy-wire to support the weight. Night came, and we weren't ready, but after coming that far along I wasn't going to quit now. I went up the pole again to connect up all the lines while Brownie played a light on the operation. I had about fifty pounds of tools and wires and ropes hanging from the lineman's belt I had borrowed from W3JW. 10:30— *she was up*. I hurried to the shack and tuned up the rig. Hooked a guy right away. Yippee!! She worked!

It was worth all the trouble. I worked new countries on the average of one a day until the buffer tube in the rig went out. When I changed it I accidentally bumped a condenser.—You know that story, but somehow it also blew a fuse, and while I was replacing the fuse, it slipped out of my hand and the spring tension conked out one of my 6146's. Now I'm QRP, and mowing lawns till I get rich enough to get going again.

Oh well, who ever said that a Ham's life is an easy one? I'll be seeing you in the next DX test. ■

antenna can be used to eliminate mechanical relay switching. This has always been a drawback in c.w. break-in operation.

Conclusion

The author having collected these gadgets between the antenna and the final decided to put them in a compact arrangement. The diagram shows how it was done to eliminate the haywire around the shack. The low pass filter, ratiometer and TR switch mount tightly on an 8″ x 17″ x 2″ chassis with an 8¾″ panel. The transformer for the TR switch is underneath the 4″ x 4″ x 3″ box. The arguments against using a TR switch have been overcome in this arrangement. No harmonics get out to the antenna if they are generated by putting the TR switch on the transmitter side of the low pass filter. Reversing them will convince you on 20 meters. The ratiometer should go on the antenna side of the filter. Perhaps in the future some manufacturer will present this idea on the market as a snappy packaged unit with a co-ax antenna switch in the vacant right hand panel space. Eventually, perhaps in another thirty years, we will see these gadgets built in all rigs and wonder how we ever got along without them. ■

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Scratchi [*from page 8*]

loving that bum Scratchi, but if he reel mad at me he may wanting to see his Lilly baby behind bars at local jalehouse. If Scratchi not writing you reel soon, then I writing again and telling you all the news and my number (prison, that is).

Most respectively,
Your scared frend,
Lil O. Watanabe

Hamfests [*from page 20*]

Park. Planned are games, contests, a transmitter hunt for 2, 6, 10 and 75 meters, a mobile judging contest, exhibits, a QSL contest and picnic lunch. More than 100 prizes will be awarded, including an advance registration prize. Tickets will cost $1.50 donation. Contact club president Ray Meyers (W6MLZ), at 717 Anderson Way, San Gabriel, Calif., ATlantic 2-0014.

Maryland

The annual Picnic and Hamfest of the Maryland Emergency Phone Net will be held in the Braddock Heights Park, Braddock Heights, Maryland, on Sunday July 7, 1957, from 10 a.m. until sundown. There will be the customary prizes, a rummage sale and auction, a ladies program, and other special events. Registration will be 50¢ for each adult, with children under 12 years of age admitted free.

Winston-Salem

The Winston-Salem Amateur Radio Club (W4NC) is sponsoring a hamfest at Tanglewood Park near Route 158 eleven miles West of Winston-Salem, North Carolina, on July 7, 1957. Swapfest, transmitter hunt, barbecue dinner, door prizes, SSB lecture, Walky-Talky Contest, QLF contest, Mobile judging and many others. Activities start at 9:00 a.m. and end at 4:00 p.m.

The park has amusements for the entire family such as horseback riding, soft drink concession, merry-go-round, swimming and athletic games. Advance registration is invited at $2.25 per adult. Registration on July 7 will be $2.75. Children who wish a barbecue dinner will be $1.25. Motel or Hotel reservations can be made for those who wish to come Saturday afternoon and stay overnight. Maps and a program brochure will be sent to all early registrants. Mail inquiries or checks for advance registration to Mr. Beacham Leonard—W4RXG, 810 South Hawthorne Road, Winston-Salem, North Carolina.

Wisconsin

The Badger Emergency Net Basket Picnic is to be held this year in Fond du Lac, Wisconsin at Lakeside Park on July 14. Registration begins at 10:00 a.m.

[*see also page 106*]

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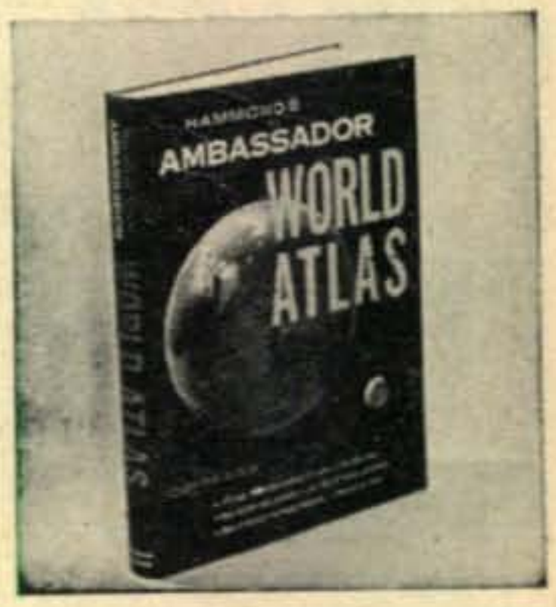

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Components for operation of above or similar types equipment. Operates from 115 volt, 60 cycle source. Includes step-down transformer, metallic rectifier, and 500 mfd. filter condenser. Sketch included. SPECIAL! Bargain priced..... **$4.75**

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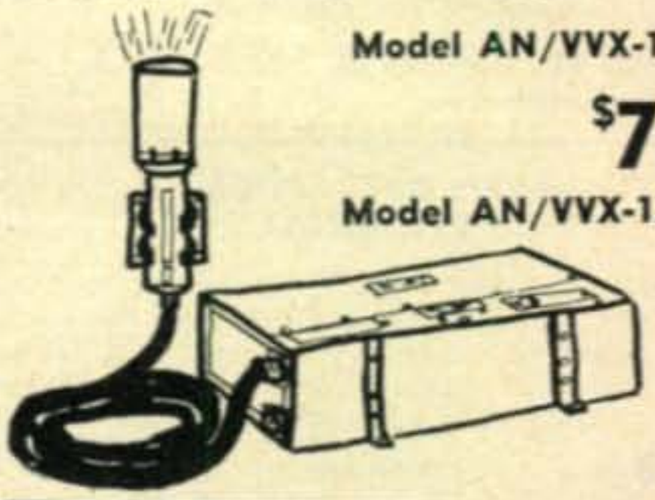
Flash visible up to 3 miles, even in bright sunlight. May be used for portable (48 lbs.) photo-flash, visual signals, experiments, etc. Consists of a very high voltage converter, electronic flash lamp & holder, cables, mounting brackets, spare parts kit with extra flash lamp included, and detailed technical manual. Unused, complete. Some require paint touch-up. Can be made to operate from 115 VAC, 60 cycles with circuit modifications. All tested & working when shipped.



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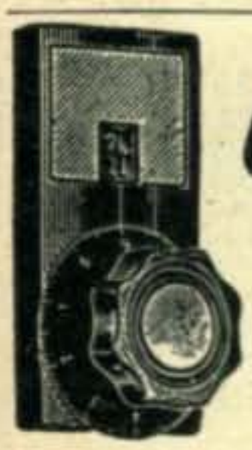

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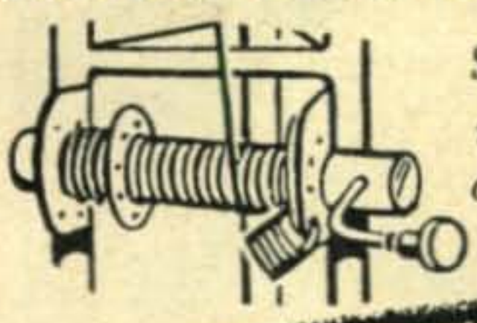

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6 Meter or 2 Meter
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● "Sure Fire" Way To Achieve STABLE CRYSTAL CONTROL with High Frequency Crystals . . .

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Crystal Oscillator Range, 48MC to 54 MC. **Output** 50-54MC or 144-148 MC. (Specify When Ordering)
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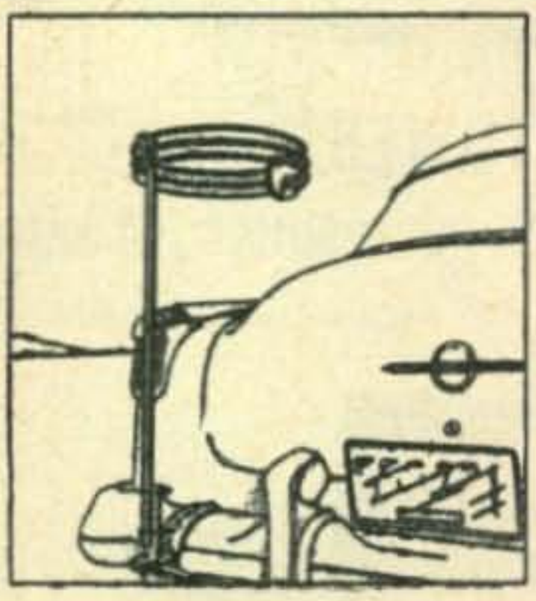

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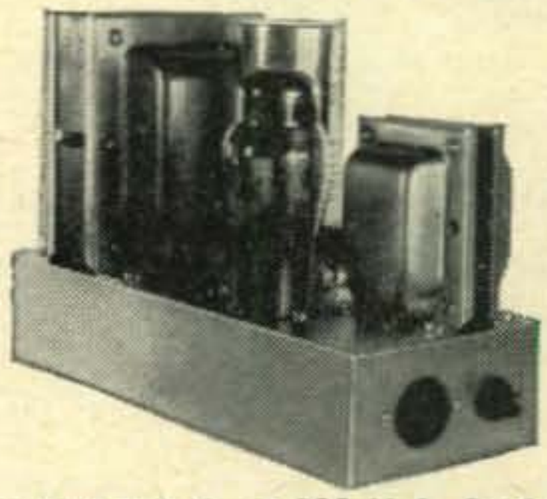

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TRANSCEIVER BC-645 **w/17tubes** converts to 420-500 mc new **$21.95**

PE 101 DYN 12-24v inpt easy to convert 6vdc **$5.95**

HANDSETS TS13 w/**PL155x68 $4.95. TS15 $5.95, TS9 $4.95.**

TELEGRAPH set **TG5** w/key&case **$5.95**, thigh code key **J45** **$1.98**

ANTENNAS fishpole 3' **39¢**, 6' **89¢**, 9' **$1.39**, 12' **$2.19**, 15' **$2.79**

CAMERA recorder 35mm single frame type **0-5** less lens 24vdc contains 4 motor relays for gun camera, 3 digit motor counter gov't cost **$300.00 new $9.95**

CONTROL for camera **P1** consists of 3 motor relays, 4 miniature relays, 2 hiamp relays w/adj rheos, res, switches etc gov't cost **$100 new $7.95 P2** 24vinpt consists of ratchet relay w/30 contact arrangement w/2 other relays, rheos, res, cond, etc. **$4.95**

All shpts. FOB whs. Send 25% dep. with all C.O.D. orders. Item sub. to prior sale & change of price without notice. Min. order $2.50.

EAST MEADOW SURPLUS CO.
462 Chestnut Lane, East Meadow, N. Y.

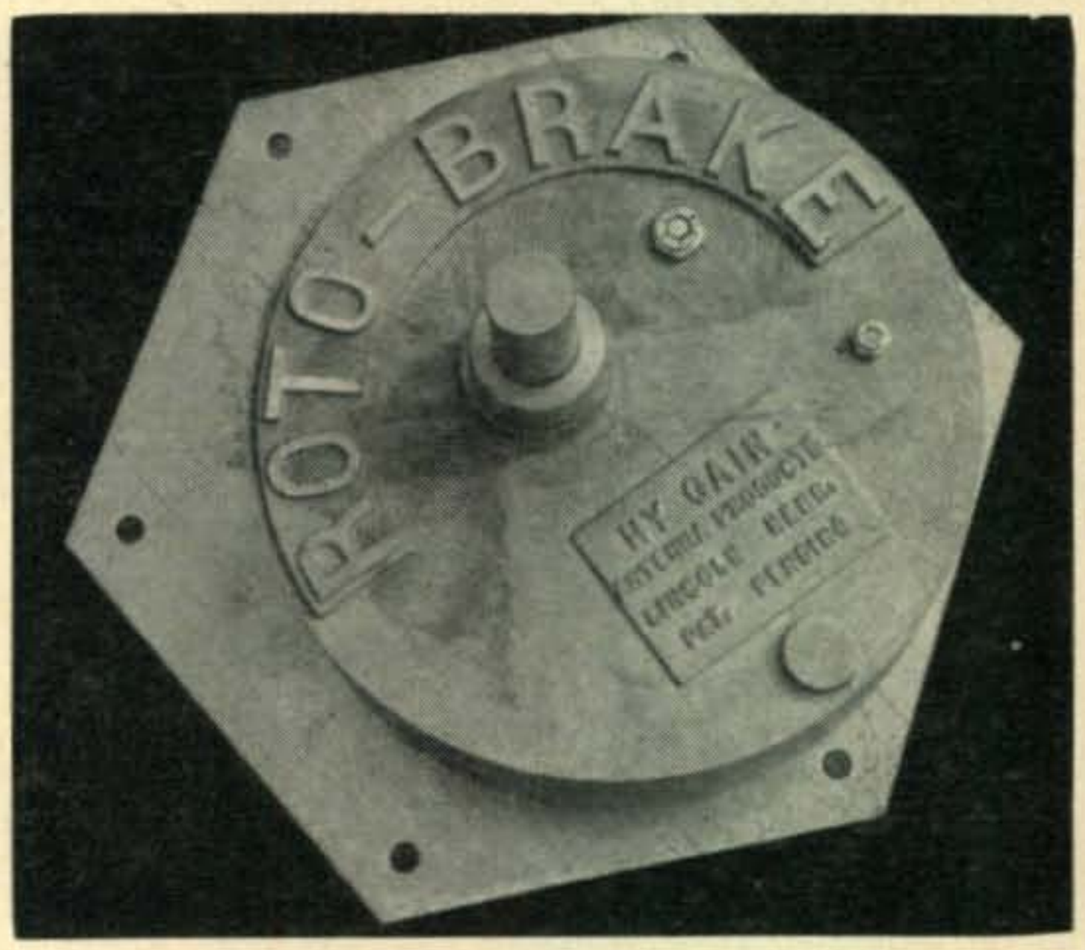
For further information, check number 41 on page 126.

Rotors [*from page 59*]

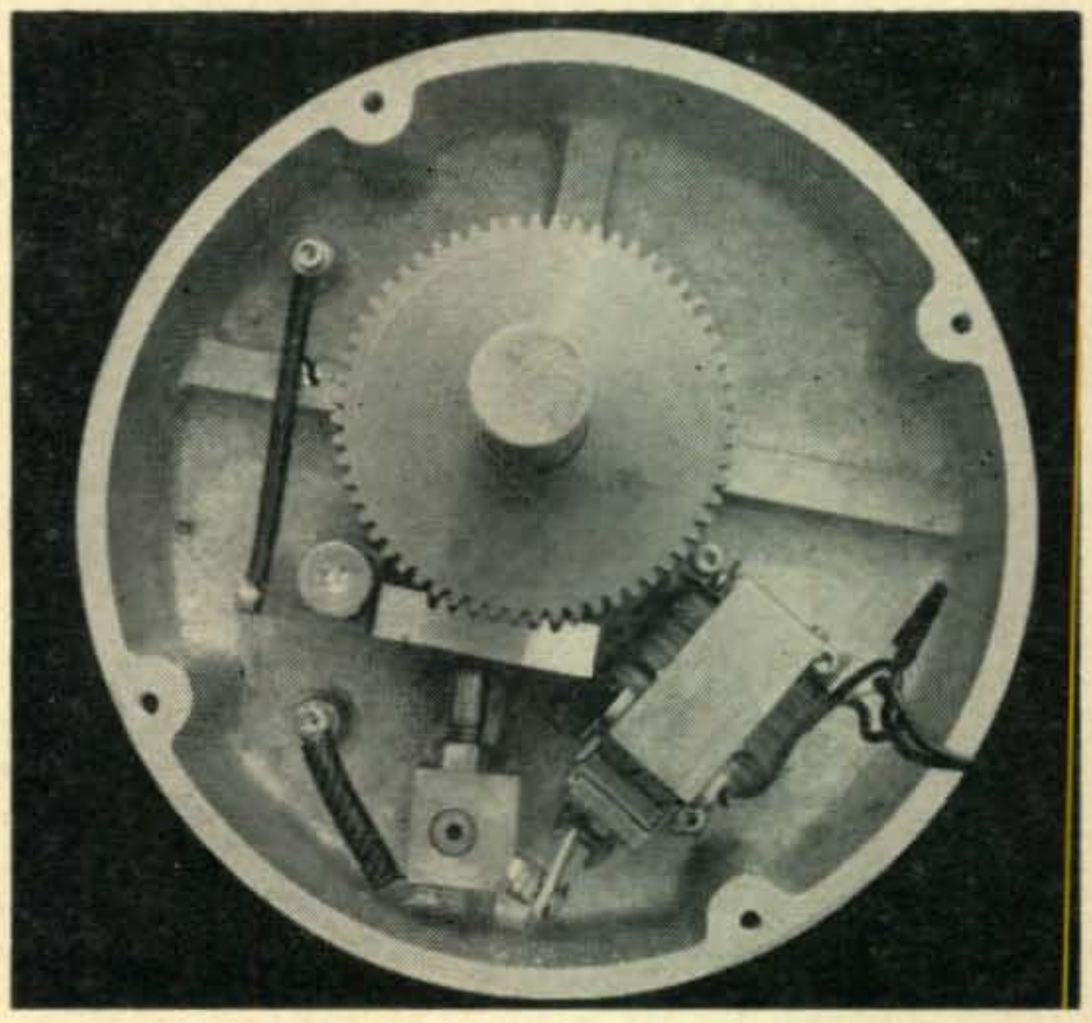
weight of the larger rotator is very light. The motor develops 250 inch pounds of torque at 3300 rpm, and turns an antenna at the rate of 1 rpm through a 3300 to 1 spur gear reducer. The weight it will support is about the same, as the above mentioned rotators.

You say you don't know how to hook-up a rotator? There is about as much to it as there is to falling asleep in a 3 AM QSO. All multi-conductor wires have a color code of some kind, so let's say that the wires are red, orange, yellow, and green respectively. Then attach the red wire to Terminal 1, the orange wire to Terminal 2, and so on down the line. Then be sure to put the same colored wire on the corresponding post on the control box. If the wire has only one odd wire then the same method may still be used, that is, take the odd wire for either Number 1, or Number 4 wire and go on from there.

So go out and put up that full size 160 meter beam, work DX-CC and let me know. ■



Top and bottom interior views of a Roto-Brake



We Told You So

Next month starts a whole new newsstand distribution system for CQ, so you may have one heck of a hunt for your next issue if you haven't yet subscribed. Besides all that frustration you save money by subscribing. Just send us a check or money order and the coupon below so we can enroll you in our subscriber's club and make sure that you get your copy in time to grab the deals in the Ham Shop before all those Johnny-Come-Lately newsstand buyers get at 'em.

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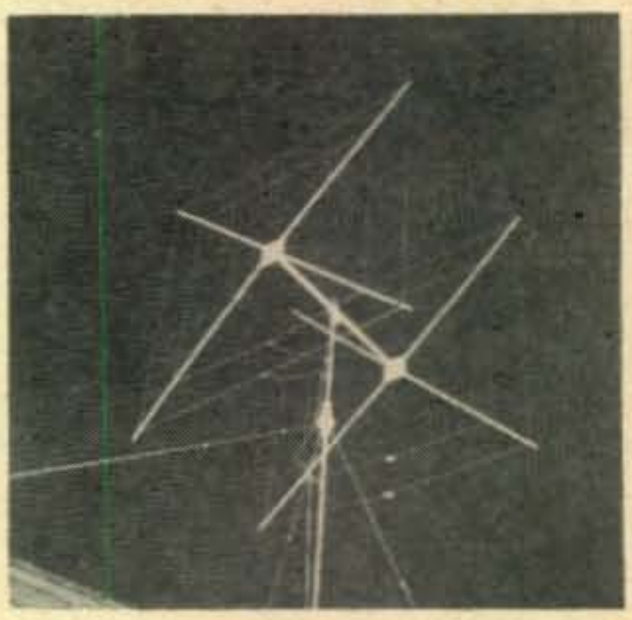
As more and more fellows decide that the Quad is really great for DX'ing it is only logical that someone should satisfy the need by putting them on the market. Cubex (W6DXZ-W6KWF) has three models, a ten, a fifteen, and a 10-15 dual band job. Prices run from $20 to $30, and gad, but you should see the db these things run up in your favor. You circle little ol' A on page 126 and we'll get the astoundment out to you pronto.

New Quad



New Products

NC-66

National has a new portable AC/DC-Battery all wave receiver that tunes from 150-400 kc, and 500 kc to 23 mc. This covers all of the marine bands as well as the broadcast and short wave broadcast bands. A ferrite loop is used for the long waves and the built-in whip for the SW bands. The price of this darb is $129.95. Boat owners, beach loungers, vacationers, etc., will find this real handy. It has a BFO for you CW men too. Circle D on page 126 and get all the facts.

Battery Eliminator Kit

Battery eliminators are darned handy devices. You can check out car radios, rev up car generators for test, do a masterful job of charging batteries, and etc. Paco has one for $31.50, you do the assembly. Output is 6 or 12V at about 60 watts continuous, double that on the short hops. Circle C on page 126 so Paco can tell you all about their whole new line of test equipment kits.

Go First Class

Why go through life making do with second rate things? For just a few cents extra you can go first class. Like for instance these here AC VTVM's that Trio Laboratories have just announced. Selling in the neighborhood of $272.00, they are something you will be proud to own. Time payments can be arranged. They meet all military specs and have loads of features that you have always wanted. Circle E on page 126 and don't forget to mention CQ when you send in your order.

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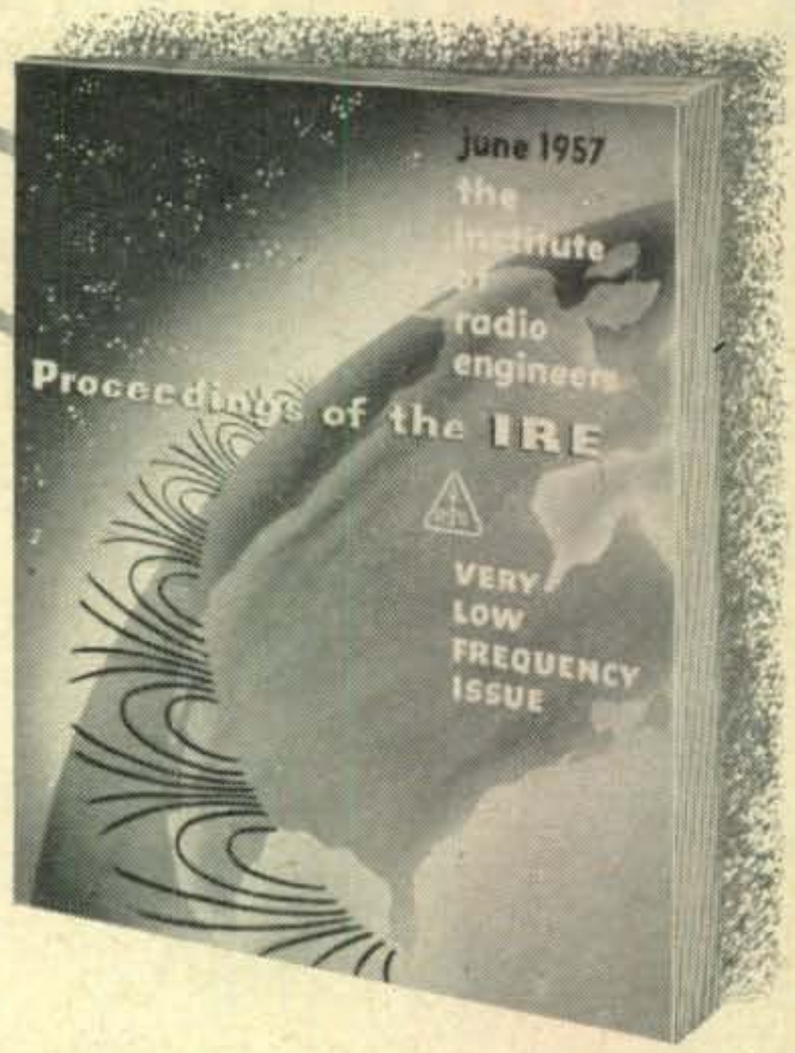
NEWS



ABOUT VERY LOW FREQUENCY PROPAGATION!

Smaller antennas, lower transmitter power, and relative freedom from atmospheric noise are reasons behind our communication services' gradual migration to the upper end of the frequency spectrum. Lying fallow and awaiting rediscovery has been the very low frequency band below 30 kc.

Now, because VLF offers a reliable means of communicating over vast global distances, there is a marked revival of interest. It is now known that VLF has highly stable propagation characteristics which make it possible to transmit data to distant points with unusual fidelity and precision. Where greater accuracy is required, such as very long range radio navigation systems and international transmission of frequency standards, VLF promises to open doors to many new and important uses.

June Proceedings of the IRE gives you the facts about VLF

This year, the Boulder Laboratories of the National Bureau of Standards and the IRE Professional Group on Antennas and Propagation co-sponsored a Symposium at Boulder, Colorado, on the propagation of very low frequency radio waves. From the papers given at this important meeting the editors of *Proceedings* have chosen those of broadest interest for publication in the June, 1957, issue.

Typical of the service offered members of IRE is this VLF report — to be used now and referred to for years to come. If you are not a member of *The Institute of Radio Engineers* be sure to reserve a copy of the June *Proceedings of the IRE*, today!

Partial Contents of this VLF issue:

"A Technique for the Rapid Analysis of Whistlers," by J. K. Grierson, Defense Reserve Board, Ottawa, Ontario, Canada.

"VLF Radiation from Lightning Strokes," by E. L. Hill, School of Physics, University of Minnesota.

"Some Recent Measurements of Atmospheric Noise in Canada," by C. A. McKerrow, Defense Reserve Board, Ottawa, Ontario, Canada.

"Intercontinental Frequency Comparison by Very Low Frequency Radio Transmission," by J. A. Pierce, Croft Laboratory, Harvard.

"The Mode Theory of VLF Ionospheric Propagation for Finite Ground Conductivity," by James R. Wait, National Bureau of Standards, Boulder, Colorado.

"The Geometrical Optics of VLF Sky Wave Propagation," by J. R. Wait & A. Murphy, National Bureau of Standards, Boulder, Colorado.

"Characteristics of Atmospheric Noise from 1 to 100 Kc/s," by A. D. Watt & E. L. Maxwell, National Bureau of Standards, Boulder, Colorado.

"The Present State of Knowledge Concerning the Lower Ionosphere," by A. H. Waynick, The Pennsylvania State University.

"Noise Investigation at VLF by the National Bureau of Standards," by W. Q. Crichlow, National Bureau of Standards, Boulder, Colorado.

"Reflection at a Shapely-Bounded Ionosphere," by I. W. Yebroff, Stanford University.

"The Attenuation Versus Frequency Characteristics of VLF Radio Waves," by J. R. Wait, National Bureau of Standards, Boulder, Colorado.

"The Waveguide Mode Theory of the Propagation of VLF Radio Waves," by K. G. Budden, University of Cambridge, England.

PROCEEDINGS OF THE IRE
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All IRE members will receive this June issue as usual. Extra copies to members, $1.25 each (only one to a member).

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For further information, check number 69 on page 126.

ALLIED needs your used equipment!

now... make the Deal of your Ham Life

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EASY PAY TERMS: Only 10% down—your present equipment should more than cover the down payment—and you have up to 18 full months to pay.

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For further information, check number 70 on page 126.

THE ACCENT IS ON VALUE... A LOW PRICED GENERAL COVERAGE RECEIVER

A new low-priced general coverage receiver featuring smart, modern styling.

Receiver is directly calibrated for the four general coverage ranges and five bandspread ranges for the amateur bands (80-10 meters).
Covers 540 KC to 40 MCS. Voice or CW.

FEATURES:

- ★ Calibrated bandspread for 10, 11, 15, 20, 40 and 80 meter amateur bands. Separate tuning capacitors, knobs, and scales for general coverage and bandspread.
- ★ Large easy-to-read 12 inch slide-rule dial with combination edge and backlighting. Has large tuning knobs with two pointers for two scales; general coverage and bandspread.
- ★ Adequate over-all selectivity with nine miniature tubes including rectifier.
- ★ Has gang-tuned RF amplifier stage for increased sensitivity and image rejection.
- ★ Covers 540 KC to 40 MC in four bands.
- ★ Two IF amplifier stages and two audio stages with tone control.
- ★ Separate antenna trimmer on front panel.
- ★ Separate High Frequency oscillator tube for increased stability. Oscillator is temperature compensated and ventilated for increased stability.
- ★ Separate RF and AF gain controls.
- ★ Series type automatic noise limiter.
- ★ Receives AM, CW and SSB signals. BFO provided for CW and SSB.
- ★ Has "S" meter on front panel for signal strength indication and more accurate tuning.
- ★ Provision for balanced or unbalanced antenna input at 50 to 300 ohms.
- ★ Handsome two-tone gray cabinet.

COVERAGE:

BAND	GENERAL COVERAGE	BANDSPREAD
A	.54-1.6 MC	
B	1.6-4.7 MC	3.5-4.0 MC (80 meters)
C	4.7-15 MC	6.9-7.30 MC (40 meters)
D	14.0-40 MC	14.0-14.35 MC (20 meters)
		20.4-21.5 MC (15 meters)
		27.0-30 MC (10/11 meters)

TUNING SYSTEM: Separate general coverage and bandspread tuning capacitors connected in parallel on all bands. Bandspread, used primarily for tuning the amateur bands, can be used as vernier for general coverage use. Separate antenna trimmer control.

AUDIO SYSTEM: Two-stage audio amplifier with single 6AQ5 output tube provides 1.5 watts at less than 10% distortion. A handsomely styled accessory speaker is available. Phone jack.

SENSITIVITY: Under 2.5 microvolts (10 DB signal/noise ratio).

SELECTIVITY	NORMAL
6 DB	5.2 kc
60 DB	22 kc

CONTROLS: Main tuning; bandspread tuning; antenna trimmer; band selector switch; RF gain control; AC ON/OFF and AF gain control; stand-by-receive switch; noise limiter switch; tone control switch; BFO pitch control; AM/CW switch.

TUBE COMPLEMENT:

RF Amp.	6BA6	2nd IF Amp.	6BA6
Freq. Conv.	6BE6	Det, AVC and ANL	6AL5
HF Osc.	6C4	1st AF and BFO	12AT7
1st IF Amp.	6BA6	AF Output	6AQ5
		Rectifier	5Y3GT

OTHER SPECIFICATIONS:
Antenna Input: 50-300 Ohms, Balanced or unbalanced.
Size: 16-13/16" Wide x 10" High x 10-7/8" Deep.
Finish: Handsome two-tone gray wrinkle finish.
Shipping Weight: Approx. 35 lbs.
Optional Accessories: Matching Speaker.

Only $15.95* down
Up to 20 months to pay at most Receiver Distributors.
*Suggested Price: 159.95**
**Prices slightly higher west of Rockies and outside U. S. A.

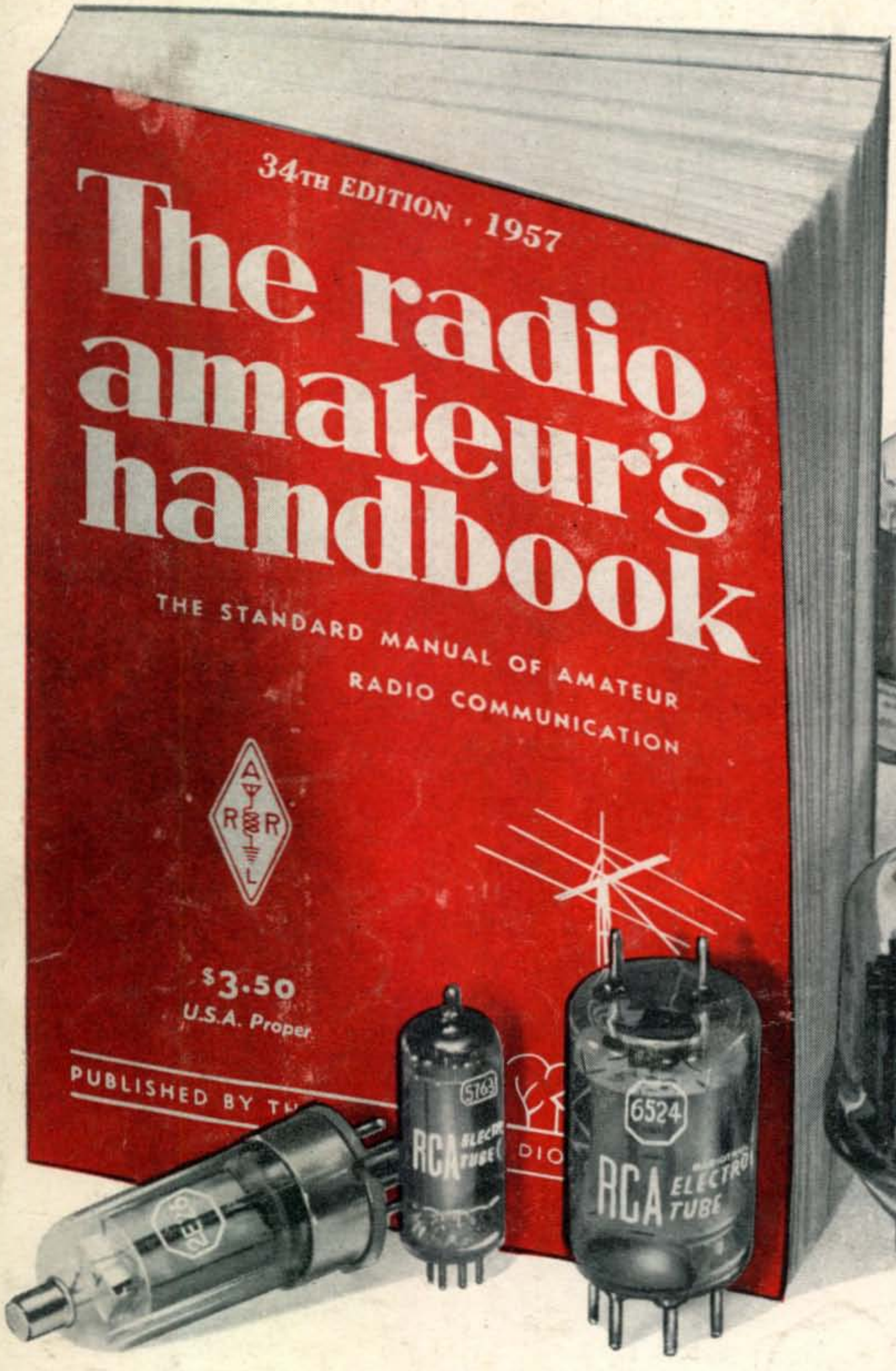
NC-188

Eight out of 10 U.S. Navy ships use National receivers

tuned to tomorrow

SINCE 1914 **National** COMPANY, INC.,
Malden 48, Mass.

For further information, check number 2 on page 126.



Again...

BEAM POWER TUBES PREDOMINATE

Beam Power Tubes—an original RCA development—continue to hold top position among leading amateur and commercial equipment designers everywhere. Take the 1957 Radio Amateurs' Handbook. In this "official" amateur technical textbook, over 75% of all transmitter and modulator units described are built around beam power types.

Why is this so?

Because Beam Power Tubes fit transmitter requirements from every angle; they take less plate voltage—require fewer driver stages—make efficient bandswitching circuits practicable—deliver a whale of a signal at low overall transmitter tube cost.

So whether you are rebuilding or "re-tubing", RCA Beam Power Tubes are your best bet. They're available in amateur power ratings to meet your needs. Get them from your local RCA Tube Distributor.

For further information, check number 3 on page 126.

TUBES FOR AMATEURS

RADIO CORPORATION OF AMERICA

Electron Tube Division Harrison, New Jersey